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21ST CENTURY SKILLS FOR 21ST CENTURY LEARNERS

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education:
Instructional Technology

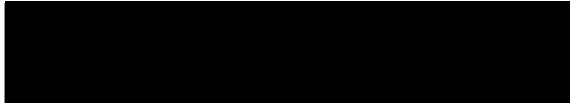
by
Jennifer Lynne Shopshear
December 2007

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ABSTRACT

The 1 to 1 Learning Program creates an environment in which every student has access to a laptop computer with a wireless connection to the Internet 24 hours a day, 7 days a week. This is not a new phenomenon in education but is gaining credibility in classrooms as technology continues to become interwoven into our daily lives. The success of this program requires strong leadership, a shared vision, community involvement, and an implementation plan from start to finish. A large part of the program's execution toward success depends on teacher's attitudes, their technological skills, and the types of professional development they are receive prior to implementation of the program. As part of the program's success it is essential for districts to provide teachers with continuous support and ongoing professional development trainings once the 1 to 1 Learning Program has been implemented.

With the 1 to 1 Program in its preliminary stage it was necessary for the Palm Springs Unified School District to identify with how teacher's currently use technology, teacher's attitudes about technology, and their perceptions as to how students will use technology in the classroom. It was critical to be aware of these elements as a way to ascribe effective professional development training and

support. The success of this program is dependent on every teacher's expertise and competence they possess while implementing technology in the classroom.

As a means of accurately measuring these attributes teachers voluntarily participated in an online survey, prior to and at the end of four day professional development training (with a technology emphasis). The survey was designed to gauge teacher's attitudes, their current uses of technology, and their perceptions as to how technology would be used by students in the classroom. The methodology was intended to establish if there is a correlation between improving teachers' technical skills along with their ability to integrate technology into their instructional practices thus, an improvement in teacher attitude.

At the close of one of the training sessions seven teachers voluntarily participate in a focus group. Their responses revealed very personal reflections as to their views about the professional development training they had just completed and how they envisioned using technology in the classroom and integrating it as part of their daily instruction with students. This is a reminder of how technological influences irrevocably redefined and will continue to differentiate the world as we know it and also gives validation to the goals school districts are trying to

achieve by promoting classrooms where all students have a connected personal computer.

ACKNOWLEDGMENTS

I would like to thank Dr. Lee Grafton and the Palm Springs Unified School District for allowing me to participate in the district's research of the 1 to 1 Learning Program. It has been a valued learning experience for me, both in and out of the classroom. Additional thanks to the seven elementary school teachers who participated in the focus group. Your responses were valuable as well as insightful.

Very special thanks to Dr. Brian Newberry and Dr. Eun-Ok Baek for sharing their expertise in technology and helping me to achieve this academic milestone of earning a Master's Degree in Instructional Technology.

DEDICATION

This is dedicated to all of the fellow educators seeking to implement a 1 to 1 Learning Program as a way of utilizing laptop computers and putting into practice additional educational technologies as tools used to enhance the learning processes of all students in the classroom.

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CHAPTER ONE:

BACKGROUND

Introduction

In response to the national technology mandates, schools across the United States have committed themselves to laptop technology programs as a way to encourage information processing and problem centered learning, and critical thinking in collaborative classrooms (*Getting America's Students Ready*, 1996). One program that is working to bring computers into the classroom is the 1 to 1 Learning Program. This program involves one student, one computer, one interactive, personalized learning experience in a wireless environment with access to the Internet 24 hours a day, seven days a week.

The purpose of this project was to develop a better understanding of the 1 to 1 Learning Program as it applies to teachers in the classroom. It's critical to the continued success of this program to identify teacher's successes and challenges. Throughout the programs history research has provided educators with successful models and wide-ranging lessons that have worked and the things that haven't worked have since been eliminated. Teachers have contributed to these accomplishments and challenges through rigorous

classroom investigations of trial and error. These manifestations have materialized to help transform this program into what it is today. When teachers delve into the program it must be with enthusiasm and an open mind as way to broaden their technical skill levels and adopt into their teaching pedagogy. Therefore, the importance of researching teacher's attitudes, 21st century skills, and perceptions as to how students will use technology in the classroom will contribute to the changes for the better when using computers in the classroom.

As a way of teachers broadening teacher's skill base they need to be provided with effective professional development training that will help advance their technical skills levels. This support needs to be ongoing and collaborative and teachers need to avoid teaching in isolation (O'Bannon & Judge, 2004). Teachers input and ideas about the training show are valued as significant. Administrators should pay careful attention to this information because it is a way to successfully plan different types of professional development and to address all of the various skill levels. Therefore, as a step forward in the right direction, using a focus group would help identify what is important to teachers. Researchers proclaim that when teachers have involvement and 'buy in' to

the program its success will be maximized if they have a say-so and are given a platform to voice their opinions.

Presently, the Palm Springs Unified School District is in the preliminary stages of the implementation of a 1 to 1 Learning Program. This program is being executed in six schools across the district into classrooms that range from elementary to high school. Most of the teachers did not have the option of deciding whether or not they wanted to partake in this program rather if implementation was at their school site and in their grade level this meant that it was their new teaching assignment. Configurations in the different schools ranged from laptops being checked out to students 24/7 (24 hours a day, 7 days per week), to classrooms of students using wireless laptops available on mobile carts only during the school day. Student participants range from grades elementary school to high school.

In preparing teachers for this implementation the district provided professional development training to teachers and administrators from the six participating schools. The trainings were designed to meet very specific needs that had previously been identified by each school's administrators. The professional development trainings were conducted by Apple Distinguished Educators. A distinguished educator means that they have expertise in educational

technology within the teaching community and are able to offer teachers the best ways of implementing technology across the curriculum. To measure how beneficial the training was and the impact it made on teachers it was decided to develop and accumulate data from an online survey.

Mixed methods were employed that included a survey and qualitative methods. Surveys can be useful tools to collect data that could not be directly observed and are used extensively in educational settings to access attitudes and many other characteristics. Therefore, as a way of measuring the effectiveness of the training as it applied to attitude, technical skills, and perceptions of students skills a survey would be used as non-experimental and an appropriate way of conducting descriptive research. Basha and Harter (1980) state, "a population is any set of persons or objects that possesses at least one common characteristic," (p. 37) the common characteristic will be identified as teacher having to integrate computers in the classroom. Additionally, the use of a cross-sectional survey allows data to be gathered from a population at a single point in time. The population will be recognized as teachers from the Palm Springs Unified School District in attendance at the

technical training which is identified as the single point in time.

Furthermore, as part of this qualitative research endeavor the researcher also attended a four day training session with a participating elementary school. At the close of this particular training session teachers were asked to partake in being part of a focus group. All participation was voluntary and there was no monetary reward or payment for their participation. In addition, all of data collected from the pre/post survey and the focus group responses will become part of a longitudinal study being conducted by the district as a way to analyze the effectiveness of the 1 to 1 Learning Program over a three year period.

Other schools that have used this program concluded that when experienced teachers partake in a 1 to 1 learning environment there is improved student achievement and an advanced digital equity overall. If a teacher's attitude favors technology and professional development is offered to improve their technological skills the results will produce enhanced learning. Once learning is strengthened, economic development should be considered as a byproduct because these technical and communication skills will be used within society. In a larger historical context, laptop technology initiatives are the latest in a long line of technological

discoveries that enhance the narrative of progressive goals of technology envisioned for education, literacy, and learning (Selfe, 2000). In order to remain competitive tomorrow, today's students need to develop techniques that readily adapt to changes as they occur (enGuage, 2003). Integrating technology is a dynamic way to help achieve current learning objectives and therefore it was significant to conduct this research and identify techniques teacher's can use to improve their uses of technology, change their attitudes about it, and transform their perceptions as to how students will use technology into actual hands on activities and experiences in the classroom.

Statement of the Problem

The problem was to discern whether teacher's attitudes about technology change when their technical skill levels improve and if this change affects their perceptions as to how students would use technology in the classroom, thus creating change in the implementation of the 1 to 1 Learning Program.

Purpose of the Project

The purpose of the project was to develop and implement a survey for the purpose of better understanding how teacher's attitude affect their ability to achieve success and overcome challenges associated with the implementation of a 1 to 1 Learning Program. With teachers at the forefront of technology in the classroom, their attitudes and technical skill levels are significant when demonstrating their expertise to students when teaching. Ideally, it should be done with enthusiasm and an energy that sparks interest and taps into the talents of every student. For these reasons the purpose of this project was intended to increase awareness as to how teachers currently use technology, their attitudes about the technology they use, and their perceptions as to how students will use technology.

If teacher's attitudes about technology can change when they were provided the proper tools and effective professional development to support these changes then they have become more proficient with their use of technology. When technology teachers do not understand deeply the technology concepts they are trying to teach, one cannot expect their students to learn (Bybee and Loucks-Horsley, 2002). To facilitate the learning of these new technical

skills, Apple resources are available to assist school districts. Some of these resources offered include obtaining professional development instructed by Apple Distinguished Educators and acquiring classroom curricula that is provided to support and insure teachers get the most from the technology. Apple Educators are highly skilled and experienced in providing teachers with hands-on experiences to help them utilize all of the preinstalled software applications that have been purchased with their laptop computers.

Some of the MacBook preinstalled software teachers learn to use as a way of increasing their digital literacy skills may include; communicating and collaborating with iChat AV, exploring words with an accessible dictionary called Tiger, promoting the strengths of all learners with iLife, supporting visual learning with iPhoto, presenting digital stories with iMovie HD, using GarageBand to communicate with sound, how to share student work with iWeb, access to Internet information using Safari. They are also instructed to keep track of and find information quickly using dashboard widgets, keep track and manage tasks with iCal, discover how to support written work with TextEdit, and improve math skills using a calculator and grapher. Additionally, audio files can be organized and shared with

iTunes; presentations can be created, published, and then presented with iWork. Students also have the option of using an iPod as a portable learning tool.

This type of learning atmosphere appears to create a welcomed opportunity for the many teachers that seem eager to engage in 21st century skills and embark on new ways of thinking and teaching. The key focus of this literacy is not the technological competency but acquiring the ability to use technology to perform critical thinking, problem solving, collaboration, communication, and innovation skills (Kay & Honey, 2006). This type of professional development program focuses on instructional ideas that blend with a constructivist environment and include opportunities to explore, reflect, collaborate with peers, work on authentic learning tasks, and engage in hands-on learning activities.

Research Questions

This body of work addresses the question, "Do teacher's attitudes about implementing technology change after attending effective professional development training (with a technical emphasis) thus, becoming more eager to learn and use 21st century skills in the classroom?" "How do they change?" "What is responsible for any observed changes?"

Significance of the Project

The significance of the project was to identify teacher's attitudes about utilizing 21st century skills that had been newly acquired through effectual professional development. Teacher's positive attitudes have to be considered to be an important aspect associated with the success and challenges connected to this program. By putting laptops in the hands of teachers/students, the Palm Springs Unified School District sought to accomplish numerous things such as introducing laptops as part of the learning experience to expand and enhance teacher/student 21st century skills. Research used in this study affirms this can improve teacher/student achievements; promote creativity and motivation through effective communication. 1 to 1 Learning Programs also promote the integration of advanced computer technology into the classroom and can support learning from home to better prepare teachers/students for success in a technology-rich world that can strengthen economic development.

Past quantitative and qualitative research studies of the 1 to 1 Learning Program have shown academic justification for achievements associated with this program. This is significant because the results show that the use of laptops have given a competitive edge to the students that

have participated in the program (Metri Group, 2006). According to the research, some additional unexpected outcomes are an impact on family and community. According to the Metri Group also affirm that students act as mentors to parents, siblings, and other community members. The Metri Group also concludes that students participating in laptop programs have shown an improvement with writing skills and developed an increased interest and ownership associated with the learning process. Evidence supports an improved student and staff attendance, reduction in behavior problems, and an increased parental interest in school activities. Some schools report having improved student and staff morale and reductions in lecture/presentation instruction and an increase in project-based learning activities.

The reasoning behind this type of learning environment is that high tech tools become an extension of student learning, thus strengthening their understanding in that test scores can no longer be the only indicators of success. This intensity adds to the quality of learning through engagement by the promoting student's success. "The laptop initiatives are now over a decade old and once a point of controversy, they have become the cornerstone of every district's technology hopes" (Wambach, 2006, p. 26). 1 to 1

Learning Programs can add dimensions which contribute to student success of possessing and using 21st century skills. Implementation of computers into learning environments provides real-life experiences, opportunities to problem solve, think critically about the task at hand and use information that is presented visually and literally that is intended to engage all types of learners. Communications skills also expand because much of the communication happens using a computer. Teamwork becomes critical as a way of developing effective communication and digital-age literacy skills are strengthened by use of multimedia products. According to enGauge (2000), these 21st Century Skills are built on extensive bodies of research - as well as on calls from government, business, and industry for higher levels of workplace readiness - to define clearly what students need to thrive in today's Digital Age.

Limitations

During the development of the project, a number of limitations were noted. For example, it would be helpful to note several limitations to our survey and its analysis. First, it should be noted that all respondents were from one school district and attending teachers were from multiple schools from across the district. This may limit the

generalizability of the results because a broader representation was not presented. Second, this research was just preliminary data and no actual teaching had yet transpired in the classroom with students. Further research may be extended to include classroom observations, teacher interviews, and administering the same survey after teachers have had some experiences within the program.

Definition of Terms

The following terms are defined as they apply to the project.

AACSB - The Association to Advance Collegiate Schools of Business

CLRN - The California Learning Resources Network is a statewide education technology service that reviews electronic learning resources for alignment with the state content. .

CTAP - The California Technology Assistance Project provides regional technology services to school districts through 11 regional offices.

CUE - A professional association called Computer-Using Educators.

Dashboard Widgets - Dashboard is home to widgets: mini-applications that let you perform common tasks and provide you with fast access to information.

Digital Literacy - Ability to use information effectively on networks to communicate.

Digital video - Motion pictures and sound displayed on a computer's monitor from data stored on the computer's hard drive, a CD-ROM, or on a network file server. The data consist of a sequence of numbers that are stored on a file; data can be manipulated and displayed by a computer.

Display projection panel - A large screen in front of the classroom displaying the image received from a computer. The image on the panel enlarges the one seen on a computer monitor for whole-class instruction.

enGuage 21st Century Skills - Digital-Age Literacy includes basic, scientific, economic, and technical literacy; Inventive Thinking refers to higher-order thinking and sound reasoning; Effective Communication elaborates teaming, collaboration, and interpersonal skills; High Productivity focuses on prioritizing, planning, and managing for results.

GarageBand - The best way to record music on a Mac is now the best way to record podcasts. station.

iCal - Elegant personal calendar application that helps you manage your life and your time.

iChat AV - iChat AV makes science fiction a reality. iChat AV lets you can chat with folks thousands of miles away in a full-screen personal video conference over any broadband connection.

ICT - Information and communicative technology

iLife '06 - Way to make the most out of every bit of your digital life. Create beautiful books, colorful calendars, dazzling DVDs, perfect podcasts, and attractive online journals.

iMovie - Themes give you moviemaking power. Just click one and the fun begins. Each theme contains a collection of professionally designed scenes that give your movie a personality from start to finish.

Information literacy - The ability to access, evaluates, and uses information from a variety of sources.

iPod - Radio that is a compact sound system that reinvents the home stereo.

iPhoto - Makes sharing photos faster and simpler than ever before. It also adds great features, including Photocasting, support for up to 250,000 photos, easy publishing to the web, special effects, and new custom cards and calendars.

IS - Information systems

IT - Information technologies

iTunes - Personal jukebox with all your music and video.

iWeb - Create websites and blogs - complete with podcasts, photos, and movies - and get them online, fast.

iWork - Create, present, and publish your work with style from school newsletters to business presentations.

Keynote 3 - Makes ordinary presentations a thing of the past.

Online synchronous discussion (OSD) - share/debate multiple perspectives online.

Safari 3 - Web browser

Streaming - A method of transmitting live or stored audio or video over the Internet.

Technology - The tools and machines used to perform tasks efficiently. In education, it is the most appropriate equipment and application to support or accomplish teaching and learning. Such equipment includes but is not limited to computers, networked thin-client units, television sets, videos, microscopic cameras, computer-based laboratories, interactive white boards, digital cameras, personal digital assistants (PDAs), and calculators. Technology is one means by which people improve their surroundings.

Telecommunications - Vast array of electronic systems for communicating information over distances.

Tiger - includes a new built-in dictionary and thesaurus.

UKOU - United Kingdom Open University has dispersed learners that study part-time and independently: most are home based.

CHAPTER TWO:

REVIEW OF THE LITERATURE

Introduction

Chapter Two consists of a discussion of the relevant literature. Specifically, it is focused of three relevant areas of importance as they pertain to 21st Century Skills for 21st Century Learners. The first topic of discussion is to depict how teacher's attitudes about technology can affect its implementation positively or negatively.

Educators at all levels are being called upon to use technology as a way to expand student experiences in the classroom. Teachers with a positive attitude about using technology is crucial especially in the classroom because teacher's attitude can often transcended to the growth and development of student's attitudes.

The second topic of discussion will expound upon the technological skills that teachers need to have in order to use these 21st Century skills in the classroom. The role of the teacher is changing and it no longer up to standard to close the door and teach in isolation but they need to interact collaboratively and use teamwork with fellow colleagues. A foundation for pedagogical content knowledge can be built through study of the literature on learning and

teaching, but it is only through practicing and reflecting on teaching practices that teaching expertise can be developed (Shulman, 1987). Some of the 21st century skills required includes collaboration, communication, creativity, innovation, information literacy, critical thinking, problem solving and global awareness (Rosenfeld, 2007). This includes the integration of digital media with instructional strategies, sharing files and making data-driven decisions to improve student achievement. Ideally, teachers will help students master these skills by integrating technology into the curriculum, thus giving them the capacity and understanding as to functioning in a technological society.

The third topic of discussion is to convey the importance of school districts to provide technological professional development that is ongoing and continuous in order to build confidence that will help teacher's bridge the high-tech gap from a novice skill level to mastery. Professional development will help by keeping the joy of learning a priority at every school and for every teacher (Warner, 2006). The International Society for Technology in Education (ISTE), a professional organization dedicated to increasing the effective use of technology has identified 10 "prerequisite factors or essential conditions that must be present in every phase of an aspiring teacher's education"

to enable teachers to create learning situations that include powerful uses of technology (ISTE, 2002, p. 16). According to ISTE, these conditions are: shared vision, access, skilled educators, professional development, technical assistance, content and curriculum resources, student-centered teaching, assessment, community support, and support policies. Becker (2001) noted that more constructivist compatible instructional practices were associated with increased use of technology for higher order applications. Research has shown that 'positive teacher attitudes toward technology are necessary for its use in the classroom (Lawton & Gerschner, 1982; Woodrow, 1992; Christensen, 2002). Once teachers have a broad array of skills they need it is essential they are provided with an avenue to learn more advance skills. Mastery is shown to afford teachers feelings of acceptance when using computers to implement curriculum and presents a smooth transition for transferring these technological skills to students.

Teacher's Attitudes About Technology

One of the prerequisites for acceptance and implementation of computers in an educational system is a positive attitude of both teachers and students toward their use (Subhi, 1999). Research shows that technology is becoming more and more integrated into the curriculum by using a personal computer and software to raise levels of learning. Dugger, Meade, Delany, and Nichols (2003) contend that every aspect of our lives is affected with technology and that students need the opportunity to attain technological literacy in core subject areas. It is how teachers and students use technology and how they envision technology as part of the curriculum and within individual school systems that can make a difference (McGrail, 2006).

In a 1999, Shubi conducted a study entitled, 'Attitudes toward Computers of Gifted Students and Their Teacher', the focus being male and female teachers and their attitudes toward computers. The sample size included 125 teachers (30 males and 95 females). The results were measured by means of a questionnaire and compared statistically to variables in math performance, IQ, gender, teaching experience, computer experience and training. The results of this study concluded only one variable, namely teacher's experience in teaching, contributed significantly to imply that the more training

and experience corresponds to more positive attitudes toward computers (Subhi, 1999). In general, the results of this survey revealed that teacher attitudes toward computers were generally positive which is consistent with the findings of two previous studies (Jackson, Messer & Mohamedali, 1987; Heywood & Norman, 1988).

As well, Subhi performed a t-test to investigate whether teachers' attitudes toward computers varied by gender. However, results revealed no significant differences between male and female teachers in this respect (Subhi, 1999). These findings are also consistent with others, and similar studies (Underwood & Underwood, 1990). Math performance, IQ, gender, computer experience and training were also measured but did not show any significance in this study (Subhi, 1999). The overall findings of attitude and gender in this study show that attitudes toward technology were generally positive and did not vary according to gender. Findings also reveal that the more teaching experience a teacher had paralleled a more favorable attitude toward computers.

Often it is easier for teachers to continue on with more traditional methods of teaching because change is difficult and presents uncertain circumstances especially when using technology. According to McGrail (2006), the

positive goals of technology for education cannot, however, be realized by computers alone; computers are only a complicated scenario of educational change. The key element in the change process is the teacher (Falkerth, 1992). Falkerth (1992) also states that "the most important component in a change process is not the innovation itself, but the beliefs and the practices of the people who are affected by it" (p.1). Hence, it is not enough to envision technology as part of curriculum but how teacher's attitudes affect students that are utilizing the technology that makes a difference.

McGrail's (2006) study was conducted with secondary English teachers' to gauge their perspectives about the technological change in English instructions when a mandatory school-wide laptop technology initiative was implemented. Two of the research questions proposed by McGrail in study were 1) "What are the secondary English teachers' attitudes toward technology in English instruction in the context of a school-wide laptop technology initiative? 2) What are the sources and influences that shape these attitudes? (p. 1060)"

The methodology and research design was informed by qualitative research methodology rooted in interpretive symbolic interactionism (Blumer, 1969) and case study design

(Creswell, 1998). This allowed the researcher to seek teacher's understandings about technology as perceived by the teachers themselves which reflected on their belief system and instructional practices associated with the laptop initiative. The participants included 6 secondary English teachers and all participation in the study was voluntary. The primary source of data collection was through interviews and the secondary source of data collection was classroom observation.

The results revealed that most secondary English teachers in this study did not reject technology and noted some benefits such as; addressing individual student needs, raising self-esteem, improving some areas of language skill study, and supporting constructivist pedagogy. However, when teachers were asked to describe their overall experiences and attitudes toward laptop technology they described many conflicts and dilemmas that were associated with the daily use of technology in the classroom. Some teachers felt that the voluntary laptop initiative was involuntary. They described it to be "pretty top down" meaning that teachers had little control over the decision to join the laptop program and that all decisions pertaining to the program were solely based on community input and neglected to consult with the teachers. Thus, these comments collaborated

with similar studies that reported that a top-down model in the implementation of educational change was a common practice among legislators and administrators (Cuban, 2001; Fullan & Stiegelbauer, 1991; Popkiewicz, 2000). Teachers claimed they were not involved in the planning or the implementation process and this can have a negative effect on attitudes. According to Fullan and Stiegelbauer, "one of the great mistakes" over the past thirty years is the "assumption" of teacher involvement in the decision making process when in fact they had been excluded in the earlier processes of planning and decision making and felt left out of the loop.

Results of the McGrail's (2006) study also exposed conflicts at the institutional level surrounding the national and state curriculum goals and technology integration mandates. Teachers were experiencing pressure to prepare students for the standardized testing and institutionalized pressure to integrate technology in the classroom. Teachers stated that the written part of the state exam did not allow use of technology and this created controversy over time spent composing on the computer as opposed to composing with a pen and paper. Russell and Abrams (2004) reported that use of technology in the context of standardized testing among teachers in 49 U.S. states

that has shown a substantial decrease in instructional uses of computers for writing as a result of paper-based state test, particularly in urban and low-performing schools.

Teachers also faced many challenges as to their understandings of theory and pedagogy pertaining to composition and some opted for students to use paper and pencil instead of the computer for much of their course work. This created conflict with students' inquiring about the conflicting agenda between pen and paper and technology (McGrail, 2006). Teacher's attitudes were deeply affected by the high expectations regarding the use of technology and having to prepare students for standardized testing. According to Warner (2006), "the attitude of the teacher about the topic, the classroom environment, the students, and technology in general will significantly influence the attitude of the students (p. 7)."

It was difficult for teachers to change their instructional procedures and implement new ones. The key element in the change process is the teacher (Falkerth, 1992) and "the most important component in a change process is not the innovation itself, but the beliefs and the practices of the people who are affected by it" (p. 1). Another aspect of change detected in the study was teacher pedagogy and to "use it all the time or most of the time"

(referring to technology) (p. 1067). Several teachers felt this was unrealistic but possible for technology to become part of their tool box and use it only when necessary.

Teachers expressed concerns about the difficulty of having to "use it all of the time" and the pressure negatively impacted their attitudes and individual teaching practices.

One teacher believed that technology, as an educational innovation, did not bring and pedagogical change in her classroom, while other educational reforms, such as cooperative learning (Keyser, 2000) of whole language (Moorman, Blanton, & McLaughlin, 1994) instructional approaches, did. She felt that the implementation of technology was often misdirected and described the focus to be misconstrued.

McGrail's (2006) study concluded that all in all, teacher's attitudes were varied when asked if "technology fit into the school's curriculum." One teacher described literacy as narrow and explained traditional literacy as reading, and writing. In contrast, another teacher's attitude reflected the belief that modern technology did play a significant role in the sociological change but worried that academic literacy and the literacy practiced in student's lives was very different. The English classroom teachers were also confused by the curriculum requirements

and had difficulty finding the best ways to integrate technology into the classroom.

Furthermore, teacher ideas and perceptions varied from those in administration. Teachers felt technology would be a better fit if used in other subject areas such as math or science and administrators did not make it clear as to their expectations about how technology should be used in different areas of the curriculum. This conceptual disagreement among teachers in this study can be attributed to their "differing images of 'what counted' as learning activities in specific content areas and the roles they envisioned for technology in facilitating such learning activities" (Windschitl & Sahl, 2002, p.198). McGrail states that, contexts for technology integration are dependent on the teacher attitude, grade level, class profile, and philosophical orientation.

In order to get a deeper understanding of teacher's attitudes about technology, constructivist and social learning theory need to also be considered, particularly when we extend the concept of life-long learning to real life situations. In a constructivist classroom, technology can play an important role in discovery and student-centered learning. The link between constructivist classrooms and the use of technology is a natural one according to Lunenburg

(1998), who asserted that each has its core value of student achievement and learning. Students learn in context and therefore teachers need to integrate technology into teaching. There is also a connection between attitude and self-efficacy, which refers to adequacy as the result of interaction between personal self-concept and confidence in the task at hand (Bandura, 1997). Imants & Tillema (1995) explained that teachers with low self-efficacy were less likely to adopt new strategies and new ideas. Researchers have explained that there is an association between self-efficacy and teachers attitudes toward technology and positive teacher attitudes toward technology are necessary for its effective use in the classroom (Lawton & Gerschner, 1982).

Rizza (2000) explains that, the use of software is quite different from integrating technology into teaching. At the heart of constructivist principals of teaching and learning is the teacher helping students to move from disseminators of information to facilitators of learning. Researchers have explained the association among self-efficacy and attitudes toward technology, desirability of learning technology, gender, age, computer experience, proficiency, computer anxiety, computer liking, and usefulness (Delcourt & Kinzie, 1993; Atkins & Storey Vasu,

2000; Zhang & Espinoza, 1998). Additionally, various studies have been conducted describing teacher's attitudes toward technology few have addressed the attitudes and the self-efficacy associated with bilingual teacher's use of technology in a multicultural educational setting.

Simonsson (2004) conducted a study of bilingual teachers along the southernmost borders of Texas and Mexico in an attempt to describe their attitude and their beliefs regarding and utilization of technology were in addressing the cultural aspects in the curriculum. Another intention of the study was to describe how bilingual teachers' attitudes about technology affect their self-efficacy towards it use. According to Simonsson, the survey data was collected from 103 elementary schools pre-Kindergarten through fifth grade. The teachers surveyed taught bilingual education and worked with a predominantly Hispanic population in two large school districts in southern Texas.

In general, the study exposed the attitudes of teachers in multicultural education improved when adequate exposure to technology was provided. Negative attitudes were often related to erroneous beliefs and a lack of experience as to how to use technology when teaching. It also confirmed the importance of administrative support and professional development as a means to development of positive attitudes

and assist teachers on the best ways to integrate technology in the classroom. The attitude and self-efficacy portion of the survey revealed 93 percent of bilingual teachers felt working with computers were stimulating, 96 percent thought computers were useful, 32 percent felt positive about working with sound editing, and 21 percent enjoyed working with video editing (Simonsson, 2002).

Most researchers agree that successful use of computers in the classroom is dependent on positive teacher attitudes toward computers (Lawton & Gerschner, 1982). The use of technology has become an integral component of work, education, communication, and entertainment and researchers are just beginning to understand teacher's teaching and technology attitudes in its complexity. The amount of confidence a teacher possesses in using computers and related informational technologies may greatly influence his or her effective implementation of technology methods in the classroom (Christiansen, 2002). Furthermore, along with the importance of having a positive attitude about teaching and learning using technology, specific skills need to be identified as ways to facilitate that learning in a 21st century classroom. In view of that, it is essential teachers become acquainted with these 21st century skills which are digital-age literacy, inventive thinking, effective

communication, and high productivity. Teachers can learn how to scaffold these to students as way of ensuring that students will thrive and survive in this digital age.

Teacher Skills Required In Teaching 21st Century Skills

21st century skills are constituted as the building blocks in education and viable to the success of teachers/students participating in laptop learning programs. According to enGauge, a framework for technology use in education, the skills that will assist in academic achievement in the 21st century have been identified as; digital-age literacy, inventive thinking, effective communication, and high productivity. Dugger, Meade, Delany, and Nichols (2003) contend that every aspect of our lives is affected by technology and that students need the opportunity to attain technological literacy in core subject areas. Not only do today's teachers need to have technological skills and teach them to students, they also need to prepare students to be socially and ethically aware as producers and consumers of interactive technologies. For those reasons, The International Society for Technology in Education [ISTE] (2000) sets standards that focus on designing student learning activities to foster equitable, ethical, and legal issues of technology by students. What's more, teachers need to become skilled in many areas, and include technology in order to support and facilitate student's development of 21st Century Skills.

Advances in technology have made significant changes within societies; therefore, student's successes in the 21st century will require exposure to information in all of its forms in order to promote the advancement of skills required to use these broad ranges of literacy's. New skills for working on-line are necessary for both teachers and learners—they are not ones that most people already possess (Kirkwood, 2006). Developing and refining informational literacy skills should be an important element of courses making much use of information and communication technology, because few students are well prepared for such activities (Macdonald, Heap & Mason, 2001; McDowell, 2002). Digital literacy skills can be described as having basic language proficiency, scientific knowledge and ability to understand scientific concepts, recognizing economic problems and the ability to identifying alternatives, effectual use of technology for specified purposes, and the ability to visually create images by means of video or other types of multimedia. The obtainment of digital literacy skills will afford teacher/students with the ability to use information effectively on networks to communicate.

Additionally, they will develop an appreciation of similarities and differences that exist culturally, thus, creating a global awareness and interpersonal relationships

that span the globe. According to Kirkwood (2006) information and communication technologies have the potential to enhance teaching and learning in higher education by improving access to and interaction with information and resources, and by facilitating dialogue between people. Although networked information and communicative technology (ICT) makes it possible for students to retrieve information and data from local, national and international sources, the use of such resources are unlikely to serve the expected purposes unless they are grounded in the educational context and integrated with the pedagogy of the course and program to which they relate (Rowley, Banwell, Childs, Gannon-Leary, Lonsdale, Urquhart, & Armstrong, (2002); Zenios, Goodyear, & Jones, (2004).

Kirkwood conducted a two year study at the Institute of Educational Technology, The Open University, United Kingdom, to see how students' used networked technologies in connections with their studies at the United Kingdom Open University (UKOU). The university consists mainly of students that study part-time and independently from home, two-thirds of the students range in age from 25 to 45 years of age. Particular aspect of this study explore how independent learners use information and communication

technologies (ICT) as part of their study activities and draw from their existing skills and experiences to further their study at the university. This study also investigates the effectiveness of how the networked learning process attends to meeting students learning needs.

The majority of student's work is an individual experience and most of the course materials have been provided to them by the university. The university also provides Internet resources from a wide array of sources such as searchable databases, electronic journals, and websites that provide accredited information. More importantly, the Internet has provided multi-way communication between people. This type of communication eliminates the isolation of working alone and promotes student dialogue with professors, interactions with fellow students, and can be used to elicit extra help with a tutor if needed. By late 2003, overall student access to computers had risen to 90% (Rae, 2004), consequently, equipment was often located in a communal family space and competition among family members for use of the equipment and/or the telephone line is a routine occurrence (Kirkwood, 2006). Time is sparse for most learners because they have other commitments such as jobs and families and the depth of study is predetermined with the design of each course. Kirkwood

states that, most students have to be selective in order to survive in the system because time is restricted due to higher priorities. Therefore, the university has designed courses in order to meet student's needs and understood the importance of time constraints put on students.

The results of the survey exposed that students used ICT even if the course did not require the use of a computer and the number of students capable of utilizing ICT was also underestimated. Only (6%) of students had no access to a computer, (5%) only accessed computer in a public place, (52%) reported using a computer for 'educational purposes.' Family correspondences accounted for (31%) equaled to leisure/entertainment at (31%), and domestic and household purposes' were at (23%), (Kirkwood, 2006). In addition to determining the context or purpose of new students' computer use, another survey was conducted to determine the extent of new students' experiences and for the particular purpose for using a computer. When students' were asked how they used the computer very few students were identified to be within the lowest two levels of experience; to be a *beginner with little or no experience* (5%) or to have only *some fairly basic experience* (15%). The option chosen most frequently was *I can use a computer reasonably well but for certain purposes only* (39%). Another interesting overall finding was

that students had attended classes to improve their ICT skill level and (27%) of the respondents had attended some additional type of training at a school, college, or technical institute.

The extent of students' experiences in using a wide range of applications was scored in one of three categories; 1) *little or no experience* 2) *some experience*, or 3) *much experience*. Interesting findings of the study show that the majority of responses in the third category, *much experience*, were limited to 'word processing' (73%), 'communicating with email' (61%), and 'getting information from the Internet/WWW' (54%). At the other end of the spectrum over two-thirds (70%) had *little or no experience* of communicating with other people using conferencing, chat or newsgroup facilities. Over 41% of the respondents access the Internet daily, 32% seek Internet access weekly, and 20% reported *rarely or never* using the Internet. (See Table 1.)

Table 1. Extent of New Students' Experience in Using a
Computer for Specified Purposes (Kirkwood,
2006 p. 123).

	Little or no experience (%)	Some Experience (%)	Much Experience (%)
Word Processing (letters, reports, ect.)	5	22	73
Desk-top publishing	56	31	13
Spreadsheet programs for circulations	41	34	25
Spreadsheet programs for creating tables, charts/graphs	43	35	22
Accessing a database, ect.	37	38	25
Creating or amending a database	51	30	19
Drawing, painting, design, ect.	57	32	11
Digital photography/video	79	15	6
Using a digital scanner for images or text input	61	28	10
Accessing information from a CD ROM for entertainment, games, ect.	23	40	37
Using a CD-ROM for entertainment, games, ect.	39	33	28
Getting information from the Internet, World Wide Web, ect.	13	33	54
Communicating with other people using electronic mail (email)	15	24	61
Communicating with others using 'chat', 'newsgroup', or 'conferencing' facilities	70	20	11
Preparing text and/or other materials for a web page	83	11	6
Preparing a set of pages, ect. for a website	86	10	4

Furthermore, these findings show that students were interested in acquiring ICT skills for learning as they related to 'finding and using information effectively', accessing 'electronic resources', and 'studying with the help of a computer'. Kirkwood explains that these findings suggest that many of the respondents had more than just basic *ICT skills*, but that their *information literacy skills* were much less well developed.

The skills required to work on-line required of both teachers and learners is to develop new skills and educators should address this by creating effective on-line activities that employ practical experiences while acquiring new skills. According to Kirkwood, course design should shift its emphasis from introducing students to basic skills and expand on extending and developing their use of ITC for educational purposes.

With digital-age literacy at the forefront in education additionally there is also need to foster inventive thinking skills which is considered critical in the 21st century. These skills, once developed, are used for adapting, managing complexities, and use of self-direction when tackling problems. It is vital teachers possess the willingness to arouse curiosity, spark creativity, and take risks in order to strengthen higher order thinking skills as

a way of nurturing the development of sound reasoning for themselves and their students.

Higher order thinking is not a new phenomenon. It has been a major category in Bloom's Taxonomy as an educational objective since 1956. It is as well linked to the cognitive domain and involves processing knowledge and the development of intellectual skills. For those reasons, more than ever in the 21st century inventive thinking skills apply, in effect, because technology makes the simple tasks easier, it places a greater burden on high-level skills (International Information and Communication Technologies (ICT) Literacy Panel, (2002, p.6). Teachers and students essentially need these skills to make inferences and decipher information while evaluating a wide range of academic domains associated with problem-solving contexts.

Integrating technology requires use of these higher order thinking skills and it becomes the teacher's role to apply these skills in appropriate situations and use them as a learning tool that will enhance the learning process. Barab (2003) emphasizes that innovation is not a simplistic practice: it involves taking risks and making mistakes. McDonald (2002) indicates that educators and researchers should stop recreating the classroom experience and comparing online learning to traditional learning by asking

the right questions as they apply to researching online learning. Therefore, constructive dialect and productive discussions among educators should play a critical role in changing traditional classroom practices with procedures that engage student's in the forum of online discussion.

In 2005 Wang conducted a research study entitled, 'Questioning skills facilitate online synchronous discussions'. The purpose of the study was to gain an in-depth view of peer interaction and the processes of knowledge construction in an Online Synchronized Discussion (OSD) environment that was structured with a series of high level questions. The intention of the instructor was to present open-ended questions that would elicit multiple perspectives by promoting student participation thus enabling them to share and debate while developing their own point of view on specified topics. To prevent the conversational threads from quickly unraveling, students were directed toward a topic of related discussion as a way to promote peer interactions while engaged in this productive discussion.

Wang's study asked this question, 'How do the questioning skills facilitate OSD for learning with the group-turn-taking mechanism?' Using OSD for this type of learning would be considered a constructivist environment

verse group-turn-taking which is said to be used in a more traditional classroom environment. The participants included 31 pre-service teachers were from different departments who took the course Classroom Management at one university in Taiwan. During the third week of class they were taught how to use the commercial learning system Wisdom Master and used Internet Explorer to access the e-learning environment. An advantage of the Online Synchronized Discussion (OSD) is that it can be a tool for substantial learning because students have sufficient time for reflecting and composing substantial messages (Im & Lee, 2004) and multiple perspectives can be debated without interrupting the flow of conversation. When students don't ask questions both teaching and learning suffer (Dillon, 1988) as in a traditional classroom that is governed by the general rule - one speaker at a time.

The goal of the study was to facilitate knowledge through an exploratory discussion that was course related using OSD. Students were presented with these three types of questions; 1)open questions to promote participation 2)comparative questions to provoke intellectual thought 3)probing questions that facilitate the process of knowledge construction. As a way to elicit multiple perspectives Wang first presented students with an open ended question and

allowed them time to respond. This was followed by a comparison question as a way of provoking intellectual moves and facilitating students with a way to reflect on the viewpoints of their peers. This second layer of questioning was done purposely to elicit thinking about similarities and differences that pertained to the previous subject matter and provided reflective feedback. According to Wang, this type of questioning moves students towards development of critical argument threads that parallel the topic and create another layer of subjectivity. Finally, in the third layer of questioning probe and synthesis questions were presented to students as a way of demonstrating the multiple dimensions involved in constructing concepts of knowledge.

The results support what is said in literature: (a) to engage student cognitively depends on the technique of carefully designing questions addressed in the discussions (Cox, Carr & Hall, 2004) and (b) structuring and guiding learners dialogue can lead to deeper dialogue, and the sort of deep dialogue that in turn leads to conceptual development is improved reasoning in learners (McAlister, Ravenscroft & Scanlon, 2004; Pilkington 2004). As said by Wang, the implication is that educators have to re-engineer their thinking to teach OSD in order to discover effective pedagogy that uses OSD as an integral component in teaching.

Therefore, it is with the utmost importance that digital-age literacy and inventive thinking are linked to entail effective communication too. Furthermore, using effective communication as an important skill in the 21st century is essential because it requires teamwork, personal and social responsibility through interactive communication. Effective communication transpires between individuals when they are capable of working together toward a common goal while developing a better understanding of new concepts, solving problems, and can act cooperatively while interacting socially. In an attempt to research this interactive communication phenomenon, McLoughlin and Luca (1999) conducted a study entitled 'A learner-centred approach to developing team skills through web-based learning and assessment'. According to the researchers, their purpose of this 2002 study was intended to develop personal transferable and professional skills needed for project management in a tertiary education unit utilizing online learning and self-directed learning pedagogies. McLoughlin & Luca (1999) stated that, today, with the increasing use of information technologies, trends toward internationalization and the burgeoning of work practices based on teams and networking has extended the skills needed by professionals.

Furthermore, they stated that employers expect a strong

knowledge base, diversified social, communication and cooperative skills, flexibility to work in different contexts and the capacity to manage information and self and others. These same skills mirror the effective communication skills that are required of 21st century learners because team effort and support is required to share knowledge through discussion, application, and analysis. Effective communication also requires professional knowledge. This professional knowledge is developed when strategies and skills are applied in context and this is considered to be self-directed learning. According to Erhaut (1992), three kinds of knowledge contribute to professional knowledge and understanding: propositional knowledge, process knowledge, and personal knowledge. Boud (1998) suggests that the capacity for self-direction includes elements of independence, dependence and interdependence and purposes that these form a continuum whereby the learner progresses from dependence, to independence and then to interdependence.

When comparing traditional higher education to professional training, higher education accentuates the intrinsic value of learning and professional education has an outcome that is skill based. A further difference is that higher education emphasizes the centrality of propositional

knowledge, while professional education emphasizes personal and process knowledge as equally important (Erhaut, 1992). According to the researchers, the framework proposed by Erhaut provides the foundation for the discussion of professional skills in context with a degree program in interactive Multimedia which requires expertise in transferable skills and project management as they relate to technology.

Acquiring knowledge is closely related with teaming, collaboration, interpersonal skills, and interaction for the purpose of effective communication. According to Candy (1991) student's approaches to learning can be identified as either surface level or deep. If a student is a surface level learner they are mainly concerned with the memorization of facts and figuring out ways to pass exams which differs from the deep leveled learner whose concentration is on searching for knowledge to developing a deeper understanding of how to apply it. In a constructivist learning environment this deep leveled learner would thrive because in a learner-centered, task oriented classroom, communication and negotiation skills are socially based processes and come into play as learners face new challenges when they are engaged in authentic problem solving (McLoughlin & Luca, 1999). In social and interactive

environment such as a constructivist classroom, student's interactive experiences will help them develop social skills which create dialogue and prepare them with ways to negotiation with others.

According to the research one of the desired outcomes of this degree program was to assist students in developing project management design models that consisted of storyboards, concept maps, and rapid prototypes. They also needed to address legal and copyright issues which required competence, teaming, and interactive communication. Another layer of the project was the integration of learning and assessment. Work was done in small groups collaboratively, creating similar experiences to what experiences in the real-world of project management would entail. Student assumed roles within the forum and all team members were expected to participate in different tasks such as; discussion moderation, questioning, and synopsis and summary. Group-based project work has been advocated for its capacity to foster professional skills and experimental learning (Paloff, 1999). Accordingly, a lot of the coursework was done online in order to provide multi-forums, peer support, feedback, development of communication skills to support thinking, discussion, negotiations and building consensus through teamwork in an online community.

In technology supported learning environments students become more self-directed and goal orientated in achieving their objectives. They are given multiple channels of expression by means of visualization, multimedia presentations, and the use of audio and video equipment but some may still need assistance in achieving their intent. Therefore, scaffolding is provided to learners through peer support and includes technology to help them complete tasks that normally would not be possible to accomplish by working independently. Integrated into pedagogical practice, scaffolding is intended to motivate the learner, reduce task complexity, provide structure and reduce learner frustration (McLoughlin & Luca, 1999) and technologies scaffold learning in ways that foster effective communication and build deep knowledge. (See Table 2.)

Table 2. How Technologies Scaffold Learning

(McLoughlin & Luca, 1999 p.578)

Technology as scaffold	Cognitive process supported
Tools for knowledge construction	Representation of ideas, beliefs and understanding
Information vehicles for exploring knowledge	Assessing information, comparing and evaluating perspectives and world views
Context to support learning by doing	Representing and simulating real world environments and situations
Controllable, shared problem space	Sharing and comparing ideas, revising, hypothesizing and arguing
Social medium for conversation, communication and collaboration	Knowledge creation by supporting discourse, argument and inquiry among a community of learners
Intellectual partner to support learning by reflecting	Articulation and reflection, mindful thinking and meaning making by constructing personal representation of reality

Learner activities were undertaken in groups to develop skills such as problem solving, peer evaluation, and collaboration. Online learning environments provide individual and shared workspaces, asynchronous communication forums for general, specific, and private conversations, resource-based scaffolding with links to materials and

sites, plus, synchronous communication for online chatting. An online learning environment can provide a strong framework for the development of personal and processed knowledge while initiating effective communication that place the learner in control while promoting dialogue in virtual spaces resulting in a productive and deep knowledge base.

The outcome of applying these skills will result in higher productivity in the real world. Teachers skilled to teach in a 21st century classroom will be providing students with learning experiences to help them understand information systems (IS) and information technologies (IT) and. Student's should be prepared to enter the work force with the ability to prioritize, plan, manage data results, and make use of high-tech tools. Implementation of knowledge will produce relevant high-quality products that will benefit society. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on the physical inputs of natural resources (Powell and Snellman, 2004). High productivity in the work place is vital in a global society.

Current information systems (IS) and information technologies (IT) require planning, design, and implementation in order to be efficient but despite current

efforts it can be debated as to whether skills gaps exist between what is being taught in IS curriculums, and what is really needed in the industry (Kim, Hsu, & Stern, 2006). In 2006 Kim conducted a study entitled, 'An Update on the IS/IT Skills Gap' the researchers goal was to identify whether skills gaps exist in three prospective areas of IS/IT that included an examination the end-user, academia, and IS/IT employers. To acquire sufficient data the researchers administered a survey in the northeastern U.S. as a way of investigating the perceived importance if IS/IT courses, information technologies, and issues critical to IS/IT. The results were then analyzed and compared IS/IT course offered by The Association to Advance Collegiate Schools of Business (AACSB) that are located in the north eastern U.S.

The business world relies heavily on technology and use of the Internet to connect users around the world to a global market. According to the Information Technology Association of America (ITAA), over 10 million members of the US workforce are engaged in IS/IT-related positions (ITAA, 2004). With the explosive growth of computers and technological advancements at the forefront of our economy a downturn has been that it has produced a very difficult job market. In fact, in 2003 to 2004, IS/IT positions have dropped by roughly 50% (ITAA, 2004) in part due to

outsourcing to foreign countries. Therefore it is critical to see how educational curriculums can better meet the needs of the industry and stay abreast of the rapid changes in the skills required to work in the technological fields and maintain the ability to produce relevant, high quality products.

There have been a number of explanations and causes for the skills gap: one is that rapid changes in technology make it difficult for individuals to obtain the requisite level of experience in these before these skills become outdated, and the other is the mismatch between academic perceptions of needs and requirements (curriculums) and industry skills requirements (Scott, Alger, Pequeno, & Sessions, 2002; Milton, 2000). Over the past several decades, a number of scholars and commentators have argued the leading edge of the economy in developed countries has been become driven by technologies based on knowledge and information production and dissemination (Powell & Snellman, 2004). Many researchers have claimed that there are implications which go further, in terms of failed systems in part due to the gaps in knowledge and understanding which exist between end users and IT staff (McDonald, 2002). High productivity is linked to innovations that create widespread cost reduction for goods and the development of new goods and services

therefore it is critical in business to foresee future changes and address these trends accordingly.

In an attempt to identify changing trends and gap in skills a questionnaire was emailed to 230 employees at a manufacturing industry located in the Northeastern United States. The respondents were asked to use a Likert-type scale and rate the perceived importance of each IS course they saw as critical in their field over the next three years. The overall results indicate that one of the most important courses was 'Personal Productivity with IS Technology'. Fundamentals of all these courses included the ability to use PC-based software and the use of spreadsheets, word processing, and related tools important when using information systems in the global business economy.

An interesting finding was the how low Project Management courses ranked and that they were only offered in 34% of the IS programs. According to Kim, an analysis of the data from 85 universities show that project management is required by fewer than 50% of the AACSB accredited schools studied. He states that this is a mismatch between IS course requirements and industry needs. He goes on to say that in a recent survey of IT executives (CIO 2005), project management was ranked #1 among nontechnical skills and

ranked #2 among technical skills in demand for IT organizations. Kim states the fundamental courses recommended by the findings are IS and Personal Productivity with IS technology, Project Management and Systems Development, and newer technology related courses such as e-Business.

The results of the skills perceived to be of importance in IS/IT technologies showed that personal productivity software and desktop operating systems topped the list. Following these skills in order of perceived importance are; network management, operating systems, project management, and database software. There are also widely used software programs in business and more clearly defined categories such as web development, programming languages, and systems analysis that would not apply to the majority of the participants surveyed.

Respondents were also asked to list five issues they felt would be critical in the near future in relation to business IS curriculums. According to Kim, Hsu & Stern (2006) security and disaster recovery was ranked #1, enterprise resource planning and training were tied at #2, quality and information control was ranked #5. Anderson and Schwager (2002) found that security was an important and emerging issue, which should be emphasized. According to a

2004 survey by the Information Technology Association of America (ITAA), information security is the area with the greatest IT growth potential over the next three to five years.

Overall the study found a real need for project management courses to be added to the curriculum. Courses should reflect industry needs for example; Project Management, E-Business, Personal Productivity, and System Analysis/Design. Also the fundamentals must be included, such as, coherent writing, ability to ask appropriate questions, effective oral communication skills, and collaborative teamwork skills (Miller & Luse, 2004). In an annual workforce development survey (ITAA, 2004) technical support and network systems design and administration saw the largest increase in jobs. Also training for end user computing needed to be considered a critical issue. It is essential for schools and universities for effective implementation of IS/IT curriculums and it is a fundamental need for program success to have continuous feedback from academia, employers, and end-users. Kim states this will improve and update IS/IT curriculums, create better trained IS/IT students for the competitive job market, and enable firms and recruiters to effectively hire staff with current up-to-date skills.

Professional Development Models

With A Technical Emphasis

The path way to instilling teacher's positive attitudes about technology that can lead to mastery of 21st century skills is by far attending to the current needs of teacher through professional development. Teachers will have to unlearn much of what they believe, know, and know how to do (Ball, 1998) while forming new beliefs, developing new knowledge, and mastering new skills. According to Brogden & Couros (2007) this shift to a learner-centered approach to education comes at a time when being skilled in a global economy is not simply about knowing how to use technology but combining traditional skills with technological ones to get work done. Therefore the demand is high to get teacher capable of integrating technology into instruction. Yet, according to research many teachers feel unprepared to confront the challenge of integrating technology in this digital age. In 2001, the National Center for Education Statistics (NCES) reported that only 33% of teachers felt ready to use computer related tools in the classroom, and fewer than 20% felt well prepared to integrate technology into instruction.

There are currently many professional development models attempting to meet these ever changing needs that

teacher's face when trying to use technology more effectively and creatively in their teaching. Two specific models that will be discussed in this literature are The Apple Classrooms of Tomorrow Development Centers (ACOT) and The Quality Teaching and Learning Model (QTL). In order to effectively integrate technology many school districts have opted significant amounts of resources toward these models in an attempt to successfully train teachers and integrate this medium into classrooms.

The Apple Classrooms of Tomorrow Development Centers (ACOT) have created an alternative context for teacher development. Participating teachers learn by observing and work with accomplished ACOT teachers and students during actual school days. According to ACOT, Situated Teacher Development is one type of professional development that allows teachers to become situated in a context of practice. Instruction is modeled by experts and participants get an opportunity to watch as they interact and work with students in classrooms during the school day.

This type of staff development activity is learner-centered and interactive because it provides teachers with an opportunity to construct and interpret the information as it is presented. ACOT implements a constructivist design model into their learning environments as a way to provide

hands on learning with specific technological tools and technology integration. This type of learning model is designed to put the responsibility on the individual for their own learning.

The value of Situated Staff Development is to engage learning that directly relates to individual needs. When teachers have the opportunity to watch trained professionals working with students they can take the most useful practices back to their own classrooms. According to ACOT, training professionals using this model affords a variety of teaching strategies that includes the use of technology in project-based, interdisciplinary instruction. As teachers watch they are able to get new ideas for integrating this into their classrooms and get validation of their teaching practices when they see it modeled by another professional.

According to Sandholtz & Reilly (2004) research from Apple Classrooms of Tomorrow model indicates that teachers move through a process of instructional evolution as they attempt to integrate technology in their classroom instruction. At certain levels of development teachers are asked to plan actual projects that would integrate technology into their instruction. For that reason coordinators are available to work with teachers to brainstorm ideas and give guidance toward specific plans for

change. The five stages of instructional evolution according to Sandholtz, Ringstaff, & Dwyer (1997) are as follows; entry, adoption, adaptation, appropriation, and invention. (See Table 3).

Table 3. Stages of Instructional Evolution in Technology-Rich Classrooms, (Sandholtz, Ringstaff, & Dwyer (1997) p.491).

Entry	Learning the basics of using technology; technical issues dominate
Adoption	Move beyond struggling with technology to successfully using technology on a basic level in ways consistent with existing teaching and learning practices
Adaptation	Move from basic use to using technology for increased productivity; More frequent and purposeful use of technology, but little change in existing teaching and learning practices
Appropriation	Use technology "effortlessly" as a tool to accomplish instructional and management goals
Invention	Use technology as a flexible tool in the classroom. Learning is more collaborative, interactive and customized; new teaching and learning practices emerge.

Depending on the teacher's skill level projects are varied from small lessons to month long lessons and some included project based units. Teachers are encouraged to be realistic in their planning and take into account setting,

curricular mandates, lack of time, or lack of equipment. ACOT states that the major purpose of this project based activity is to get teachers to utilize the resources they already have on hand to take the first step toward technology integration and constructivist teaching. Teachers with entry level skills have realized that they too can create effective ways to use technology in their classrooms.

These newly acquired skills need reinforced with immediate and ongoing follow-up support or the excitement can fade and so will the enthusiasm. A crucial part of the program is to provide ongoing support once the training has ended. This follow up support usually comes can come from the Teacher Development Coordinators. They are prepared to handle issue as they arise; such as hardware issues and setting up technology goals. It is vital for the success of the program to provide ongoing support to teachers because if they cannot obtain the help they can get discouraged and frustrated and possibly abandon this new way of teaching.

Teacher teams are essential as a way of providing support for program's implementation. In many cases the professional development is attended by teams of teachers and upon returning to their site are able to provide vital support to each other. This type of teaming also requires the school site principle to have a commitment to a changing

vision of learning and instruction. Their commitment might include teacher release time for training, equipment available upon completion of the training, flexibility with instructional schedules, allow time for planning and reflection, and acknowledge efforts and accomplishments.

Clearly, the importance of open communication between the staff, administration, and district personnel are crucial to successful implementation. As in any professional development design model there are barriers that have been identified with this type of program implementation. According to ACOT some of the recognized problems associated with this model once teachers had completed the training and were back in the classroom were; ineffective communication, lack of defined roles and responsibilities and power struggles prevented team building amongst the staff. Financial concerns were also noted to affect certain aspects of the program and were therefore added to the list. Once these were recognized as problems, individual responsibilities were recognized which lead to effective communication. In order to reduce the roles of authority and power struggles it was noted that staff had to progress toward team building.

Essentially, teachers need to learn how to use technology to its fullest potential as a tool for

constructivist learning. This situated professional development model introduced teachers to activities that were hands-on, made available active learning experiences and provided opportunities to work in teams and later reflect with colleagues. Time was given to create projects that could be used in the classroom as a way to fully utilize the power of technology and utilize what was available in the classroom. Additionally, Apple Classrooms of Tomorrow (1994) report that teacher's need ample training and support, and teachers want challenging experiences and opportunities to collaborate seriously with their peers who have good ideas and are excited about what they are doing. Situated Professional Development affords teachers many of these opportunities that create real experiences that are associated with constructivist teaching firsthand.

With teachers at the forefront of student-learning they are faced with the significance of utilizing technology resources to their fullest potential. However, this incorporation of technology often fails to succeed because of barriers that impede the integration. According to Brinkerhoff, (2006), the barriers that impact technology integration can be grouped into four categories: resources, institutional and administrative support, training and experience, and attitudinal or personality factors.

Additionally, Cuban, Kirkpatrick, & Peck (2001) state that training was seldom offered at convenient times for teachers, nor was it specific to meeting their needs because they had not been asked to identify them. Successful integration of technology across the curriculum will require teachers to execute different classroom procedures and establish new routines. Moreover, for effective integration to occur it is essential that teachers receive ongoing professional development in order to shift from traditional instruction to a more constructivist-compatible instruction.

Teaching and learning is complex and demands a commitment to ensure dynamic learning environments that provide learning experiences that align to current trends and effective approaches to technology integration. An example of a professional development program that seeks to meet teacher's needs and establish ways to successfully integrate technology in the context of student-centered instructional practices is called 'The Centers for Quality Teaching and Learning'. In this recent study, researchers Matzen & Edmunds (2007), analyses the relationships between this type of professional development model and the teacher's use of technology in their classrooms and their general instructional practices. The study was also intended to examine the relationship between constructivist-

compatible instruction and technology use. As stated by Pierson (2001), teachers must understand how technology connects with both pedagogy and the content of the curriculum; a change in the instructional use of computers is dependent upon understanding the instructional practices needed to use technology while teaching the curriculum.

According to Matzen & Edmunds (2007), The Quality Teaching and Learning Model (QTL) is a seven day, 50-hour, intensive professional program that models the connection between instructional practices, the curriculum, and the use of computers. Five of the seven days training requires teachers to presume the role of students as a way of providing essential modeling and practice with program components. Teachers are able to connect to how students learn because educational theories are integrated with ways to practice using technology and integrate curriculum. Teachers have the option of training during the school year or during the summer. The remaining two days as used as a follow-up that comes about during the school year and is required of all participants. Teams are made up of three to five participants and can include teachers and administrators from several school sites. This type of learning supports and enables the development of professional communities (McLoughlin & Luca, 1999). Teamwork

affords teachers the opportunity to engage in thoughtful dialogue about technical issues and build a foundation for collegial interaction and support.

As part of the QTL program an evaluation was designed to examine the implementation and impact of the program on teacher change in areas of focus explicated in the model: technical skills, awareness and use of educational theories and practices, instructional practices related to the use of the computers, and general instructional practices (Matzen, 2003). The data collection included surveys, case studies, teacher reflections, interviews, feedback on the professional development, and teacher's final projects.

An analysis of the data reported that teachers had indeed made changes in technology integration and their instructional practices but no increase in the general instructional practices. According to the research, quantitative data sources were used with a single-group quasi-experimental, time-series design with pre-, post-, and follow-up surveys were used. It was designed to quantify how teachers' practices and use of technology scaled from traditional to constructivist. New directions in teaching and learning that integrate technology across the curriculum in meaningful ways call on teachers "to act as knowledge builders, as collaborators and as reflexive practitioners

[through the use of] models for the use of digital technologies in both initial teacher education and ongoing professional development" (Lawless, & Freake, 2001, p. 121).

Qualitative data also included surveys and included case studies and journal entries that were collected from two schools. The use of surveys was intended to measure participants' self-reported general instructional practices, technical skills, knowledge and awareness of educational theories and practices, and instructional use of computers in the classroom. The survey results noted that more constructivist instructional beliefs were associated with the increased use of technology for higher order applications. An analysis of the pre and post survey scores indicated that there was a positive change in general instructional practices and a change in the instructional use of computers suggesting that the relationship between constructivist compatible instruction and technology continues. This meant that participants had increased their use of technology in student-centered ways, learned in the professional development, and were better able to understand the relationship between instruction practices and instructional use of the computer. The results showed consistency between teacher's use of technology and a correlation with their instructional beliefs. Constructivist

beliefs result in technology being used to promote student-centered learning with a hand-on approach.

Additionally, outcomes of the study exposed that the QTL professional development model increased teachers' use of technology at varied levels. As suggested by Erhaut (1994) "relatively simple uses of technology may be more a productive path to achieving teacher change than expecting teachers to use technology, from the outset, to achieve high-end instructional goals (p. 33)." Together constructivist practices and technology integration create a complex association. The research suggests that the interaction may depend at least partly on the type of professional development received (Matzen & Edmunds, 2003). Long term professional development programs support the kinds of changes required in this digital age to implement technological standards and create experiences that will engage students in productive participation that promotes the development of 21st century skills.

Summary

The literature important to the project was presented in Chapter Two included three areas of discussion. The first being teacher's attitude about technology, followed by 21st

Century Skills, finally, identifying two types of professional development models with a technical emphasis.

Teacher's attitudes are significant to the successful integration of technology in education. Most researchers agree that successful use of computers in the classroom is dependent on positive teacher attitudes toward computers (Lawton & Gerschner, 1982). Educators at all levels need to use technology as a way to expand student experiences in the classroom and a teacher's positive attitude about using technology is crucial especially in the classroom. The teacher's attitude can often transcended to the growth and development of student's attitudes. The overall findings show that attitudes toward technology were generally positive and did not vary according to gender. Findings also reveal that teachers with a more favorable attitude about computers are usually linked to a constructivist learning environment.

Furthermore, research results exposed that most teachers did not reject technology and noted some benefits such as; addressing individual student needs, raising self-esteem, improving some areas of language skill study, and supported constructivist pedagogy. However, when teachers were asked to describe their overall experiences and attitudes toward laptop technology they described many

conflicts and dilemmas that were associated with the daily use of technology in the classroom.

Teacher's attitudes were deeply affected by the high expectations regarding the use of technology and having to prepare students for standardized testing. It was difficult for teachers to change their instructional practices and implement new ones. Another aspect of change detected in one study was teacher pedagogy and to "use it all the time or most of the time" (referring to technology). In order to get a deeper understanding of teacher's attitudes about technology, constructivist and social learning theory need to be considered, particularly when we extend the concept of life-long learning to real life situations.

The second topic of discussion expounds upon the importance of teachers developing 21st century skills and integrating them with technology. These skills are constituted as the building blocks in education and viable to all laptop learning programs. The skills that will assist academic achievement in the 21st century were identified as; digital-age literacy, inventive thinking, effective communication, and high productivity. Digital-age Literacy refers to the ability to decipher information in all of its forms. The research revealed that developing and refining informational literacy skills should be an important element

of course design that includes use of information and communication technology, because few students are well prepared for such activities (Macdonald, Heap, & Mason, 2001; McDowell, 2002). Furthermore, research findings show that students are interested in acquiring ICT skills for 'finding and using information effectively', accessing 'electronic resources', and 'studying with the help of a computer'.

With digital-age literacy at the forefront in education there is also a need to foster inventive thinking skills. These skills are used for adapting, managing complexities, and use of self-direction when tackling problems. Integrating technology requires higher order thinking skills and the teacher's role is to apply these skills when it is appropriate to use them as a learning tool that will enhance the learning process. As said by Wang (2005) the implication is that educators have to re-engineer their thinking to teach in order to discover effective pedagogy that uses technology as an integral component in teaching.

Effective communication can transpire between individuals when they become capable of working together toward a common goal. This provides ways of developing a better understanding of new concepts, solving problems, and act cooperatively while interacting socially. Researchers

stated that employers expect a strong knowledge base, diversified social, communication and cooperative skills, flexibility to work in different contexts and the capacity to manage information and self and others. Effective communication also requires professional knowledge and how to apply it. Acquiring this knowledge is closely related with teaming, collaboration, interpersonal skills, and interaction for the purpose of effective communication.

In technology supported learning environments students become more self-directed and goal orientated in achieving their objectives. Therefore, scaffolding should be provided to learners through peer support and includes technology to help them complete tasks that normally would not be possible to accomplish by working independently. Teachers skilled to teach in a 21st century classroom will provide students with learning experiences to help them understand information systems (IS) and information technologies (IT) and the end result will be higher productivity in the real world.

Therefore, it is critical for educational curriculums to better meet the needs of the industry and stay abreast of the rapid changes in the skills required to work in the technological fields and maintain the ability to produce relevant, high quality products. High productivity is linked to innovations that create widespread cost reduction for

goods and the development of new goods and services therefore it is critical in business to foresee future changes and address these trends accordingly.

Courses should reflect industry needs for example; Project Management, E-Business, Personal Productivity, and System Analysis/Design were seen as important to today's job market. Also the fundamentals must be included, such as, coherent writing, ability to ask appropriate questions, effective oral communication skills, and collaborative teamwork skills (Miller and Luse, 2004). It is essential for schools and universities to provide effective implementation of IS/IT curriculums and it is a fundamental need for any of these program's success to have continuous feedback from academia, employers, and end-users. Kim states this will improve and update IS/IT curriculums, create better trained IS/IT students for the competitive job market, and enable firms and recruiters to effectively hire staff with current up-to-date skills.

The third topic of discussion is to convey how important it is for school districts to provide technological professional development that is ongoing and continuous in order to build confidence integrating technology. Teachers need experience using and incorporating high-tech tools as a way to move from novice skill level to

mastery. Teachers will have to unlearn much of what they believe, know, and know how to do (Ball, 1998) while forming new beliefs, developing new knowledge, and mastering new skills. According to Brogden & Couros (2007) this shift to a learner-centered approach in education comes at a time when being skilled in a global economy is not simply about knowing how to use technology but combining traditional skills with technological ones to get work done.

One way of training teacher to integrate technology in the classroom was Apple Classrooms of Tomorrow (ACOT). They offered Situated Teacher Development as one type of professional development model where teachers are situated in a context of practice. Instruction is modeled by experts and participants get an opportunity to watch as they interact and work with students. This type of staff development activity is learner-centered and interactive giving teachers the opportunity to construct and interpret the information as it is presented. ACOT implements a constructivist design model into their learning environments as a way to provide hands on learning with specific technological tools and technology integration. At the school site some of the post-training problems associated with this model were identified as ineffective communication between colleagues, lack of defined roles and

responsibilities and power struggles prevented team building amongst the staff. In addition financial concerns also affected certain aspects of the program.

A second professional development model discussed was The Quality Teaching and Learning Model (QTL) which is a seven day, 50-hour, intensive professional program that models the connection between instructional practices, the curriculum, and the use of computers. The first five days of the professional development model required teachers to presume the role of students as a way of providing essential modeling and practice with program's the components. Educational theories were integrated with ways to practice using technology to integrate curriculum and afford teachers the ability to connect to how students learn. Additionally, the QTL professional development model showed an increase in teachers' use of technology but at varied levels. These results showed consistency between teacher's use of technology and a correlation with their instructional beliefs. Constructivist philosophy is also found to be consistent with technology use to promote student-centered learning with a hand-on approach.

Both of these professional development models addressed teacher's needs according to their varied skill levels. As suggested by Erhaut (1994) "relatively simple uses of

technology may be more a productive path to achieving teacher change than expecting teachers to use technology, from the outset, to achieve high-end instructional goals (p. 33)." Long term professional development programs should support teachers by identifying their skill level and teaching ways to implement technological standards in order to be successful. Teachers need a voice as to the type of professional development that best meets their needs and trainings need to be scheduled at convenient times. These learning experiences should be created with the purpose of engaging teacher/students in productive participation that promotes the development of 21st century skills.

CHAPTER THREE:

METHODOLOGY

Introduction

Chapter Three documents the steps used in developing the project. Specifically, the objective of this study was to develop understanding of what technology skills are currently used by teachers, their attitudes about technology, and their insight as to how students might use technology. Data was collected from an online pre/post survey that was taken prior to and after attending one, four day professional development training. Additionally, data was collected from a focus group that consisted of teachers from one of the participating elementary schools. A greater part of data generated will be used by the Palm Springs Unified School District as part of a three year longitudinal study. The preliminary cross-sectional survey results presented in this study will be used in the future as a way of measuring the 1 to 1 Learning Program's successes over a three year period and planning forthcoming professional development trainings.

In order for the district to arrive at its goal of reaching its maximum potential within the 1 to 1 learning Program while preparing teachers/students with 21st century

skills it was crucial to understand teacher's attitudes, their technical skills, and perceptions about how students will use technology because they are at the forefront of technology use in their classrooms.

Population Served

This is an overview profile of the population served as it pertains to the Palm Springs Unified School District. The district resides in Riverside County, California. It is located at 333 S. Farrell Dr., Palm Springs, California. In 2005-2006 the district's student enrollment was reported to be 20,847. The number of teachers was reported at 1,030 and the number of schools was 25. The racial and ethnic subgroups that make up the Palm Springs Unified School District as reported to California Basic Educational Data System (CBEDS) include African American, American Indian or Alaska Native, Asian, Filipino, Hispanic or Latino, Pacific Islander, White (Not Hispanic). Hispanic or Latino currently makes up the larger of the groups.

Presently, the District Technology Profile identifies computers available for use by students; those used by staff for instructional activities are also included when counting computers at the various schools. The count is then divided

by student enrollment to arrive a student-per-computer figure. According to the California Department of Education Demographics Office (CBEDS) on 8/23/06 the Palm Spring Unified School District Technology Profile student per computer ration was; Elementary Classrooms 7.5, Middle Schools 8.1, High School 5.9, and Continuation School 2.2. This data pertains to this study because it reveals the student/computer ratio in the district prior as it applied prior to implementation of the 1 to 1 Learning Program which makes the realization of one computer per student very unique to this program.

Data Collection

The study focused on 57 teachers from the Palm Springs Unified School District; they have voluntarily agreed to take part in this study. Therefore, as part of this qualitative research study the researchers used Zoomerang.com to create a Cross-Sectional Survey as a means of gathering information of a population at a single point in time. The population surveyed included 57 teachers and administrators from the Palm Springs Unified School District who would soon be putting into practice this 1 to 1 Learning Program in their classrooms.

The context for this study was to administer an online Educational Technology Teacher Survey prior to teachers receiving any professional development training and then administering an Educational Technology Teacher Survey Post Training at the completion of the training. The survey was divided into three categories 1) How teachers use technology 2) Teachers attitude about technology 3) Perceptions as to how students will use technology. In addition, a post survey was had a slight change to the verbiage used. For example the pre survey questions read 'I use' and the post survey read 'I will use'. This was purposely changed as a means of detecting a change in skill level, attitude change, and change in perceptions that may have occurred at the end of the professional development training. These three areas were identified as most important because teachers are at the forefront of technology integration in their classrooms and their attitude often reflects their desire to obtain new skills. The significance of this data collection would serve as a way to devise training teachers and afford them with the best possible support to ensure the program's success.

Prior to beginning the four day professional development training all participants were asked to sign an Informed Consent Form (see Appendix A). Then participants were asked to take an online survey (see Appendix B) before

beginning the training and a post survey (see Appendix C) at the completion of the training, participation was voluntary. The pre survey consisted of 49 questions. The questions were divided into three specific areas that included 1) how teachers use technology, 2) teacher's attitudes about technology 3) perceptions as to how students will use technology. The last question included space for a written response for any additional comments. At the close of one, four day professional development training a focus group was used to collect data. The focus group participants consisted of seven teachers from an elementary school. Teachers responded to eight questions and participation was voluntary. (See Appendix D). The participants did not receive anything of monetary value. The pre and post survey results were accessed online through Zoomerang.com and percentage was used as means to measure the results.

The grade levels, subject areas and programs taught of the participants included; 2 teachers from K-1, 5 teachers from Grade 2, 12 teachers from Grade 3, 16 teachers from Grade 4, 11 teachers from Grade 5, 2 teachers from Grade 6, 2 teachers from Grade 7, 1 teacher from Grade 8, 4 teachers from Grade 9, 3 teachers from Grade 10, 3 teachers from Grade 11, and 3 teachers from Grade 12.

Additionally, 1 teacher from an After School Program, 1 teacher from Adult School, 10 teachers that teach all elementary subjects, 3 teachers from (English Language Learners) ELL Elementary, 2 teachers from (English Language Learners) ELL Secondary, 2 teachers from Elementary Special Education, and 0 teachers from Secondary Special Education.

Furthermore, 3 teachers from Secondary English Language Arts, 5 teachers from Secondary Math, 1 teacher from Enhancing Education through Technology (EETT) Math Program for Middle School, 3 teachers from Secondary Science, 2 teachers from Secondary Social Studies, and 2 teachers from Secondary Other.

Data Analysis

Analyses of the pre and post survey results were measured by percentage and then presented in tables. The percentage of 100% was used as a baseline then percentage differences were either added or subtracted to reflect any change in attitude, skill level, or perception that may have occurred as a result of attending the training. The baseline of measure for comparison is found under the table subheadings columns entitled '*Never*', '*Strongly Disagree*', and *Disagree*. These recorded changes were reflected in the pre and post survey data were reported as an increase (+) or

decrease (-). The differences from the pre and post survey were then recorded in the last column of each table. The preliminary data presented in all additional columns was not represented in these results but would be represented in future analysis as part of a three year longitudinal study that has been implemented by the Palm Springs Unified School District. Additionally, the data obtained from the focus group questions was transcribed and evaluated for emergent themes that were also reflected in the survey and relevant to the Literature Review.

Summary

Teacher's attitudes about technology are generally positive. When their skill level is increased thus increasing their abilities they are more likely to integrate what they have learned into their teaching practices. The survey revealed that teachers are likely to use technology in their classroom when they are given the tools used in the integration. For example, laptop computers and LCD projectors are used together as a tool to instruct students in such a way that all students can see what is being shown. Teachers felt that the training was viable and most teachers were interested in future professional development training to learn strategies that enrich student learning.

CHAPTER FOUR:

RESULTS AND DISCUSSION

Introduction

Included in Chapter Four was a presentation of the result of completing the project. The significance of the survey used in this research was designed to measure if a notable change occurred in teacher's technology use, teacher's attitudes about technology, and their perceptions as to how students will use technology. This preliminary research is being conducted in conjunction with Dr. Lee Grafton of the Palm Springs Unified School District in part due to the district's newly implemented 1 to 1 Learning Program. This body of work addresses the question, "Do teacher's attitudes about implementing technology change after attending effective professional development training (with a technical emphasis) thus, becoming more eager to learn and use 21st century skills in the classroom?" How do attitudes change? Why?

The Educational Technology Teacher Survey and Educational Technology Teacher Survey Post Training consisted of forty-nine questions, six of which were related to demographics and the findings can be found under the Population Served heading of this paper. The survey

questions were grouped into three parts 1) How do teachers use technology - questions (1-12), 2) Teacher's attitudes about technology - questions (13-23), 3) Perceptions as to how students will use technology - questions (24-43). The results are presented accordingly.

Presentation of the Findings

To show how teachers currently use technology in the classroom Part 1 of the Educational Technology Teacher Survey consisted of twelve responses worded as 'I do' pertaining to what teachers currently do with technology. This was measured prior to attending professional development training (with a tech emphasis). Educational Technology Teacher Survey Post Training Survey consisted of the same twelve responses but the verbiage was changed to read 'I will' do this using technology. The survey was administered at the end of the professional development training. The pre/post survey results were measured by percentage then by comparing the pre/post survey results we were able to show an increase or decrease; baseline is 100%. When the two responses were compared they were either recorded as (+) increase or (-) decrease. The data used to make this analysis is shown shaded in each table.

Presentation of the findings after comparing the Pre/Post survey results show 'digital media to prepare instruction' increased 9%, use of 'digital media to deliver instruction' increased 30%, 'post and share information electronically' increased 58%, 'integrate the use of digital media with other instructional strategies' increased 38%, 'post and share information with colleagues electronically' increased 40%, and 'access curricular resources from District shared resources' increased 38%.

Additionally, 'use digital media for record keeping' increased 24%, 'use digital media to access student information for data-driven decision making to improve student achievement' increased 10%, 'communicate electronically with colleagues in school regarding instruction' increased 19%, 'communicate electronically with colleagues outside of school regarding instruction' increase 16%, 'communicate with parents' increased 40%, and 'communicate with students electronically' increased 51%.
(See Table 4).

Table 4. Educational Technology Teacher Pre/Post Survey

Results, Part 1: How Do Teachers Use Technology

Part 1: How Do Teachers Use Technology?	Never	At Least Once a Term (%)	At Least Once a Month (%)	At Least Once a Week (%)	Daily	Increase = (+) Decrease = (-) of Pre/Post
	Pre /Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre /Post	
1. I do (will) use digital media to prepare instruction.	11%/2%	11%/0%	26%/11%	19%/32%	33%/55%	+9%
2. I do (will) use digital media to deliver instruction.	32%/2%	16%/0%	12%/9%	21%/38%	19%/51%	+30%
3. I do (will) post and share information electronically.	60%/2%	19%/19%	9%/34%	5%/21%	7%/23%	+58%
4. I do (will) integrate the use of digital media with other instructional strategies.	40%/2%	18%/4%	12%/21%	18%/36%	12%/36%	+38%
5. I do (will) post and share information with my colleagues electronically.	40%/0%	25%/2%	9%/23%	14%/55%	12%/19%	+40%
6. I do (will) access curricular resources from the District's shared resources.	40%/2%	19%/9%	18%/30%	12%/51%	11%/9%	+38%

Table 4. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 1: How Do Teachers Use
Technology?

Part 1: How Do Teachers use Technology?	Never	At Least Once a Term (%)	At Least Once a Month (%)	At Least Once a Week (%)	Daily	Increase = (+) Decrease = (-)
	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post
7. I do (will) use digital media for record-keeping.	37%/13	9%/13%	14%/15	12%/17%	28%/43	+24%
8. I do (will). use digital media to access student information for data driven decision-making to improve student achievement.	12%/2%	25%/19%	32%/19	25%/47%	7%/13%	+10%
9. I do (will) communicate electronically with colleagues in my school regarding instruction.	23%/4%	16%/4%	21%/13	23%/47%	18%/32	+19%
10. I do (will) communicate electronically with colleagues outside of my school regarding instruction.	35%/19%	28%/19%	14%/23%	12%/36%	11%/2%	+16%
11. I do (will) communicate with parents electronically.	53%/13	18%/19%	12%/40	9%/19%	9%/9%	+40%
12. I do (will) communicate with students electronically.	70%/19	7%/13%	5%/23%	11%/13%	7%/32%	+51%

To clearly identify a way of illustrating teacher's attitudes about technology, Part 2 of the Educational Technology Teacher Survey consisted of twelve responses worded as 'I believe' and 'I think' pertaining to teachers existing attitudes about technology. This was measured by the survey prior to attending professional development training (with a tech emphasis). Educational Technology Teacher Survey Post Training consisted of the same twelve responses but the verbiage on the Post Survey was changed to read 'I will' do this using technology. The pre survey results were compared to the post survey results to show an increase or decrease and measured as percentage; baseline is 100%. When the two responses were compared they were either recorded as (+) increase or (-) decrease. The data used to make this analysis is shown shaded in each table.

Post survey results about teacher attitudes reveal that 'am confidence using digital media in instruction' increased 24%, 'think it is worth effort to learn how to integrate digital media applications into teaching' increased 3%, 'believe that all students should have an opportunity to use digital media applications at school' increased 5%, 'believe digital media helps students learn academic content' increased 4%, 'believe students need to learn how to use digital media to prepare for future' increased 2%, and

'using digital media application make a better teacher' showed 0% or no change.

Moreover responses included, 'digital media applications enable efficiency and proficiency and more productivity' increased 2%, 'digital media take away from instructional time' increased 4%, 'digital media create more problems than their worth' increased 6%, 'digital media applications help motivate students to learn' increased 4%, 'students more likely to be on task when using digital media for teaching and learning' increased 8%, 'students are more interested in learning when digital media is used' increased 9%. (See Table 5).

Table 5. Educational Technology Teacher Pre/Post Survey

Results, Part 2: Teacher's Attitudes about
Technology

Part 2: Teachers Attitudes About Technology	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	Increase = (+) Decrease = (-) of
	Pre/Post	Pre/Post	Pre/Post	Pre/Post	Pre/Post
13. I am confident using digital media in instruction.	12%/2%	25%/11%	49%/49%	14%/38%	+24%
14. I think it is worth the effort for me to learn how to integrate digital media applications into my teaching.	9%/4%	0%/2%	16%/21%	75%/72%	+3%
15. I believe that all students should have an opportunity to use digital media applications at school.	5%/0%	0%/0%	18%/21%	77%/79%	+5%
16. I believe the use of digital media helps students learn academic content.	4%/0%	0%/0%	26%/30%	70%/70%	+4%
17. I believe that students need to learn how to use digital media to be prepared for the future.	4%/0%	0%/2%	11%/17%	86%/81%	+2%
18. Digital media applications help me be a better teacher.	4%/0%	4%/0%	40%/30%	53%/70%	+0%

Table 5. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 2: Teacher's Attitudes about
Technology

Part 2: Teachers Attitudes About Technology	Strongly disagree (%) Pre/Post	Disagree (%) Pre/Post	Agree (%) Pre/Post	Strongly Agree (%) Pre/Post	Increase = (+) Decrease = (-) of Pre/Post
19. Digital media applications enable me to be more efficient and productive.	4%/0%	4%/6%	37%/36%	56%/57%	+2%
20. Digital media applications take away from instructional time.	47%/45%	49%/47%	4%/9%	0%/0%	+4%
21. Digital media create more problems for me than they're worth.	51%/43%	47%/49%	2%/9%	0%/0%	+6%
22. Digital media applications help motivate students to learn.	4%/0%	0%/0%	30%/26%	67%/74%	+4%
23. My students are more likely to be on task when we use digital media for teaching and learning.	4%/0%	4%/0%	47%/51%	46%/49%	+8%
24. My students are more interested in learning when we use digital media applications in class.	5%/0%	4%/0%	40%/38%	51%/62%	+9%

As a way of better understanding teacher's perceptions as to how students will use technology Part 3 of the Educational Technology Teacher Survey consisted of twenty responses worded as 'I' pertaining to teacher's current perceptions. This was measured prior to attending professional development training (with a tech emphasis). Educational Technology Teacher Survey Post Training Survey consisted of the same twenty responses but the verbiage was changed to read 'I will' and 'students will' showing how students will be using technology. This survey was administered at the end of the same professional development training. The pre survey results were then compared to the post survey results to show an increase or decrease and measured as percentage; 100% is baseline. The two responses were compared and either recorded as (+) increase or (-) decrease. The data used to make this analysis is shown shaded in each table.

Interestingly, the results of the survey note that 'in the classroom students will decide when to use technology' increased 20%, 'in the classroom student will decide how to use technology' increased 25%, 'students will work in teams with other students when using technology' increased 30%, 'students will use word-processing programs to complete

written work' increased 29%, and 'will students use Internet to find information for assignments' increased 19%.

Additionally, 'students correctly cite references to complete assignments' increased 47%, 'students will check online resources for reliability' increased 43%, students use technology to solve real-world problems' increased 45%, 'students use information from CD-ROMS or Internet to predict real world changes' increased 55%, 'students will use technology to acquire math content standards' increased 55%, and 'students will use technology to acquire reading content standards' increased 45%.

As well, results showed that perceptions as to 'students use technology to acquire writing content standards' increased 54%, 'students use technology to acquire science content standards' increased 52%, 'students use technology to acquire social studies content standards' increase 49%, 'students engage in netiquette and ethical behavior using technology' increased 49%, 'students use technology to communicate with others' increased 53%, and 'discuss technology related social issues as part of a class assignment' increased 54%. Furthermore, with the implementation of the 1 to 1 Program teachers perceived on average 'students time spent each week using computers in school' increased 35 %.(See Table 6.)

Table 6. Educational Technology Teacher Pre/Post Survey
Results, Part 3: Perceptions as to How Students
Will Use Technology

Part 3: Teachers Perceptions as to how Students will use technology	Never (%) Pre /Post	Sometimes (%) Pre /Post	Usually (%) Pre /Post	Always (%) Pre /Post	Increase = (+) Decrease = (-) Pre /Post
25. In my classroom, I (will) let my students decide WHEN to use technology.	33% /13%	56% /70%	5% /11%	5% /6%	+20%
26. In my classroom, I (will) let my students decide HOW to use technology.	42% /17%	53% /55%	5% /21%	0% /6%	+25%
27. In my classroom, students (will) work in teams with other students when using technology.	32% /2%	47 /64%	18% /28%	4% /6%	+30%

Table 6. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 3: Perceptions as to How
Students Will Use Technology

	Never (%)	Once a term (%)	Once a month (%)	Weekly (%)	2-4 times per week (%)	Dail y (%)	Increase = (+) Decrease = (-)
	Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post	Pre/ Post
28. How often do (will) your students use word- processing programs to complete written work assignments?	33% /4%	19% /11%	19% /21%	18% /30%	5% /19%	5% /15%	+29%
29. How often do (will) your students use the Internet to find information for assignments?	23% /4%	21% /13%	25% /17%	21% /32%	5% /13%	5% /21%	+19%
	Never (%)	Sometimes (%)	Usually (%)	Always (%)	Increase = (+) Decrease = (-) Pre/Post		
	Pre/Post	Pre/Post	Pre/Post	Pre/Post			
30. How often do your students correctly cite references they use to complete assignments?	68%/21%	25%/36%	5%/23%	2%/19%	+47%		
31. How often do you require your students to check online Resources for reliability?	60%/17%	23%/36%	12%/19%	5%/28%	+43%		

Table 6. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 3: Perceptions as to How
Students Will Use Technology

	Never (%)	Once a term (%)	Once a month (%)	Weekly (%)	2-4 times per week (%)	Daily (%)	Increase = (+) Decrease = (-)
	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre/Post
32. How often do (will) your students use technology to solve real-world problems?	56% /11%	21% /23%	11% /17%	9% /32%	4% /11%	0% /6%	+45%
33. How often do (will) you have your students use information from CD-ROMS or the Internet to predict real world changes?	72% /17%	12% /19%	9% /23%	4% /30%	2% /9%	2% /2%	+55%
34. How often do (will) you have your students use technology to acquire math content standards?	61% /6%	11% /9%	12% /17%	7% /40%	5% /21%	4% /6%	+55%

Table 6. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 3: Perceptions as to How
Students Will Use Technology

	Never (%)	Once a term (%)	Once a month (%)	Weekly (%)	2-4 times per week (%)	Daily (%)	Increase = (+) Decrease = (-) Pre/Post
	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	
35. How often do (will) you have your students use technology to acquire reading content standards?	49% /4%	11% /4%	9% /21%	18% /26%	5% /9%	9% /36%	+45%
36. How often do (will) you have your students use technology to acquire writing content standards?	58% /4%	16% /6%	5% /23%	11% /26%	5% /13%	5% /28%	+54%
37. How often do (will) you have your students use technology to acquire science content standards?	63% /11%	19% /11%	9% /30%	5% /23%	4% /19%	0% /6%	+52%

Table 6. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 3: Perceptions as to How
Students Will Use Technology

	Never (%)	Once a term (%)	Once a month (%)	Weekly (%)	2-4 times per week (%)	Daily (%)	Increase = (+) Decrease = (-) Pre/Post
	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	
38. How often do (will) you have your students use technology to acquire social studies content standards?	60% /11%	16% /13%	19% /26%	4% /28%	2% /17%	0% /6%	+49%

	Never (%)	Sometimes (%)	Usually (%)	Always (%)	Don't Know (%)	Increase = (+) Decrease = (-) Pre /Post
	Pre /Post	Pre /Post	Pre /Post	Pre /Post	Pre /Post	
39. How often do (will) your students engage in netiquette and ethical behavior when using technology resources to complete assignments?	51%/6%	14%/13%	14%/6%	16%/68%	5%/6%	+49%

Table 6. (Continued) Educational Technology Teacher Pre/Post
Survey Results, Part 3: Perceptions as to How
Students Will Use Technology

	Little to no time (%) Pre /Post	15-30 mins. (%) Pre /Post	30 mins. to one hour (%) Pre /Post	One to two hours (%) Pre /Post	2-4 times per week (%) Pre /Post	Daily (%) Pre /Post	Increase = (+) Decrease = (-) of Pre/Post
40. How often do your students use technology to communicate with others?	70% /17%	12% /15%	7% /30%	2% /36%	2% /0%	7% /2%	+53%
41. How often do your students discuss technology related social issues as part of a class assignment?	63% /9%	12% /23%	18% /17%	5% /32%	0% /11%	2% /9%	+54%

	Little To no Time (%) Pre/ Post	15- 30 Mins (%) Pre/ Post	30- 60 Mins (%) Pre/ Post	1-2 Hrs. (%) Pre/ Post	2-5 Hrs. (%) Pre/ Post	5-10 Hrs. (%) Pre/ Post	More Than 10 Hrs. Pre/ Post	Increase = (+) Decrease = (-) Pre/ Post
42. On average, my students (will) spend about each week using computers in school.	39% /4%	21% /2%	16% /9%	7% /26%	5% /32%	9% /13%	4% /15%	+35%

Continuing with the presentation of data the results as they relate to teacher's perceptions as to 'how' and 'will' students use technology Part 3 of the Educational Technology Teacher Survey it was important measure the Information Literacy currently used and the perceptions as to what would be used. As a way of comparing this information the survey was worded 'have used' and 'will use' in the classroom. The two responses were compared and either recorded as (+) increase or (-) decrease. The data used to make this analysis is shown shaded in each table.

The data results of the information literacy are as follows; 'word processing' increased 22%, 'spreadsheets' increased 17%, 'charts and/or graphs' increased 49%, 'presentations using PowerPoint or KeyNote' increased 68%, 'electronic portfolios' increased 40%, 'digital stories using Photostory, iMovie, iPhoto or comparable programs, increased 65%, 'podcasts' increased 60%, 'webpages' increased 20%, 'Wikispaces' increased 8%, 'blogs' increased 13%, 'Garageband' increased 45%, 'GoogleEarth' (or comparable program) increased 28%, 'email' increased 11%, and 'iChat' increased 47%. The data used to make this analysis is shown shaded in each table. (See Table 7.)

Table 7. Educational Technology Teacher Pre/Post Survey
Results, Part 3: Question 43, Informational
Literacy Skills

43. To complete assignments in my class, my students have created or (will) use the following. (Please select all that apply.)	Pre/Post	Increase = (+) Decrease = (-) of Pre/Post
Word-processed documents	72%/94%	+22%
Spreadsheets	9%/26%	+17%
Charts and/or Graphs	23%/72%	+49%
Presentations using PowerPoint or KeyNote	21%/89%	+68%
Electronic Portfolios	7%/47%	+40%
Digital Stories using Photostory, iMovie, iPhoto or comparable programs	9%/74%	+65%
Podcasts	4%/64%	+60%
Webpages	16%/36%	+20%
Wikispaces	5%/13%	+8%
Blogs	2%/15%	+13%
Garageband (or comparable applications)	4%/49%	+45%
GoogleEarth (or comparable programs)	12%/40%	+28%
E-mail	21%/32%	+11%
iChat	0%/47%	+47%
Other, please specify	25%/9%	+16%

Additionally, the transcribed responses of the focus group questions are presented in their entirety. (See Appendix D). The responses to these questions are discussed in the findings section.

Discussion of the Findings

To begin the discussion with the data results of the Educational Technology Teacher Survey Pre/Post, Part 1: How Do Teachers Use Technology; the post survey found that teacher's skills increased significantly from the pre survey results as a result of the professional development training. The results were measured as having a positive increase to every skill measured. The greatest increase in skill level with a 58a% increase which was teacher's abilities to post and share information with parents and students electronically. This was closely followed by a 51% increase in teacher's ability to communicate electronically with students. According to Kirkwood, 2002 this can be explained to suggest that many of the respondents had more than just basic *ICT skills*, but that their *information literacy skills* were much less well developed. The skills required to work on-line required of both teachers and learners is to develop new skills and educators should

address this by creating effective on-line activities to employ practical experiences while acquiring new skills.

This was followed by a 40% gain in two skill areas; first identifying posting and sharing information with colleagues electronically equaled with communicating with parents electronically. Although networked information and communicative technology (ICT) makes it possible for students to retrieve information and data from local, national and international sources, the use of such resources are unlikely to serve the expected purposes unless they are grounded in the educational context and integrated with the pedagogy of the course and program to which the relate (Rowley, Banwell, Childs, Gannon-Leary, Lonsdale, Urquhart, & Armstrong, 2002; Zenios, Goodyear & Jones, 2004).

To support the constructivist learning environment often associated with integrating computers in the classroom, there was a 38% increase when teachers learned how to integrate the use of digital media with other instructional strategies that included students to work in groups. Another constructivist principle was identified as sharing and teamwork was supported with an increase of 38% because teachers felt they could access curricular resources from the district's shared resources located online. These

files are available online and often posted by teachers from other schools within the district. This was closely followed with a 19% increase by teachers stating that they will communicate electronically with colleagues regarding classroom instruction. This type of response lends itself to a constructivist learning environment where the deep leveled learner would thrive because in a learner-centered, task oriented classroom, communication and negotiation skills are socially based processes and come into play as learners face new challenges when they are engaged in authentic problem solving (McLoughlin & Luca, 2002).

Additionally, there was a 9% gain in teacher's abilities to use digital media to prepare instruction and a 24% skill gain with teacher's abilities to use digital media for record keeping such as grades. This change in skill level according to Sandholtz, Ringstaff & Dwyer (1997) this shows how teachers move from 'Entry' learning the basics of using technology; technical more to "Adoption" which is shown as a move beyond struggling with technology to successfully using technology on a basic level in ways consistent with existing teaching and learning practices. Next, 'Adaptation' will follow as teachers become more comfortable in their abilities to move from basic use to using technology for increased productivity; however, more

frequent and purposeful use of technology, can still imply that there is little change in existing teaching and learning practices. The survey results indicated that 98% of teachers felt comfortable when using digital media to prepare instruction and one of the largest gains at 51% of teachers opting to communicate with students electronically. As stated by Sandholtz & Reilly (2004) increasing one's ability in skill level can be identified as 'Appropriation' and the propensity to use technology "effortlessly" as a tool to accomplish instructional and management goals. One of the prerequisites for acceptance and implementation of computers in an educational system is a positive attitude of both teachers and students toward their use (Subhi, 1999).

Furthermore, this positive attitude was clearly reflected in the findings of the Educational Technology Teacher Pre/Post Survey Results, Part 2: Teacher's Attitudes about Technology. The results showed 100% of the teacher's survey felt that using digital media applications helped them to become better teachers, 100% believed that students should have the opportunity to use digital media at school, and 100% believed digital media helped students learn academic content. This was closely followed by 98% of teacher's belief that students need to learn how to use digital media to be prepared for the future and 94% believed

digital media allowed teachers to be more efficient and productive. McGrail states, it is how teachers and students use technology and how they envision technology as part of the curriculum and within individual school systems that can make a difference. The key element in the change process is the teacher (Falknerth, 1992) and when measured on the survey 93% of teachers overall felt that it was worth the effort to learn how to integrate digital media into teaching. To support this finding, Dugger, Meade, Delany, and Nichols (2003) contend that every aspect of our lives is affected with technology and that students need the opportunity to attain technological literacy in core subject areas.

Attitude can also be connected with self-efficacy, which refers to adequacy as the result of interaction between personal self-concept and confidence in the task at hand (Bandura, 1997). Imants & Tillema (1995) explained that teachers with low self-efficacy were less likely to adopt new strategies and new ideas. Evidence shows that some teachers described their overall experiences and attitudes toward laptop technology associated with conflicts and dilemmas that are associated with the daily use of technology in the classroom. This low self-efficacy presented from previous research studies was also revealed in the survey results as 9% of teachers surveyed reported

that they felt that using digital media creates more problems that they're worth.

Rosenfeld (2007) states that the integration of digital media with instructional strategies, sharing files and making data-driven decisions can improve student achievement. When measured by the survey 100% of teacher's attitudes reflected strongly that students were likely to be on task and more interested in learning when they used digital media applications in class and 100% agree that digital media motivates students to learn. The mean score of attitude change was measured on the post survey as 17% gain. Additionally, results indicate that 95% of teachers believe that students should have an opportunity to use digital media applications while at school. Hence, it is not enough to envision technology as part of curriculum but how teacher's attitudes affect students that are utilizing the technology that makes a difference. Teachers with a positive attitude about using technology can transcend to the positive growth and development of student's attitudes. One interesting finding noted on the pre survey was that 37% of teachers did not feel confident using digital media in instruction, however, when measured on the post survey only 13% were still not feeling confident.

Along with a good attitude, today's teachers also need to have technological skills and scaffold them to students as a way of preparing students to be socially and ethically aware as producers and consumers of interactive technologies. New skills for working on-line are necessary for both teachers and learners-they are not ones that most people already possess (Kirkwood, 2006). Developing and refining informational literacy skills should be an important element of courses making much use of information and communication technology, because few students are well prepared for such activities (Macdonald, Heap & Mason, 2001; McDowell, 2002). This shortcoming is reported in the Literature Review and was revealed in the results of the Educational Technology Pre/Post Survey which showed that students currently are lacking in many of the 21st century skills. However, the results of the post training survey also showed that once teachers were acquainted with new ideas as to integrated computers in the classroom - perceptions changed. Therefore, constructive dialect and productive discussions among educators should play a critical role in changing traditional classroom practices with procedures that engage student's in the forum of online discussion.

To report the finding from Educational Technology Teacher Survey Pre/Post Training, Part 3: Perceptions of How Students Will Use Technology there was a 12% increase in letting students decide WHEN to use technology, a gain of 25% in allowing students to decide HOW to use technology. Post survey results show that nearly all teachers would allow students to work in teams with other students when using technology. As stated in the Literature Review, scaffolding can provide learners with peer support and includes technology to help them complete tasks that normally would not be possible to accomplish by working independently. The overall mean score from Part 3 on the survey as it pertains to perceptions indicated a 42% increase.

On the pre survey it was revealed that 33% of students never use word processing programs to complete assignments and 23% of students never use the Internet to find information for assignments. According to the Literature Review of research, it indicates that one of the most important courses was 'Personal Productivity with IS Technology'. It is significant to note that the fundamentals of all courses included the ability to use PC-based software and the use of spreadsheets, word processing, and related tools important when using information systems in the global

business economy. The survey results from question 43 are reflected in the research showing word processing and presentations to be perceived by teachers with a high ranking in student's abilities to use them. Thus, this information strengthens the importance of 1 to 1 Learning Programs by helping students gain the skills they need.

Furthermore, other skills that showed deficiency as they pertain to digital literacy were revealed that 68% of students did not have the ability to correctly site references to complete assignments and 60% were not required to check online resources for reliability. The Educational Technology Teacher Survey showed that the majority of perceived student's skills were deficient in using technology to solve real-world problems and the Internet to predict real-world changes. The greater part of students perceptions show 61% math, 49% reading, 58% writing, 63% science and 60% social studies did not use technology to integrate content standards. Although networked information and communicative technology (ICT) makes it possible for students to retrieve information and data from local, national and international sources, the use of such resources are unlikely to serve the expected purposes unless they are grounded in the educational context and integrated with the pedagogy of the course and program to which the

relate (Rowley, Banwell, Childs, Gannon-Leary, Lonsdale, Urquhart, Armstrong, 2002; Zenios, Goodyear, Jones, 2004). Of course these perceptions were changed when compared to the Educational Technology Teacher Training Post Training and now show an increase, this, was in part because teachers were given the technological tools to make it happen.

Past research studies revealed that developing and refining informational literacy skills should be an important element of course design that includes use of information and communication technology, because few students are well prepared for such activities (Macdonald, Heap & Mason, 2001; McDowell, 2002). Evidence of this reported in the survey show that 51% of students do not engage in netiquette and ethical behaviors when using technology to complete assignments, 70% of students do not use technology to communicate with others outside of the classroom as part of class assignments, and 63% of students do not discuss social issues such as copyright laws, plagiarism, Internet safety or cyber-bullying as part of class assignments. This could be explained by lack of time spent on the computer, as evidence, prior to implementation of the laptop program teachers reported on average the 39% of students on average spent little to no time using the computer in school. However, over the past several decades,

a number of scholars and commentators have argued the leading edge of the economy in developed countries has been become driven by technologies based on knowledge and information production and dissemination (Powell & Snellman, 2004). Current information systems (IS) and information technologies (IT) require planning, design, and implementation in order to be efficient but despite current efforts it can be debated as to whether skills gaps exist between what is being taught in IS curriculums, and what is really needed in the industry (Kim, Hsu & Stern, 2006). Students need to be given the insight and ways to develop skills that are relevant to high-productivity and what is expected in the real-world.

Additionally, the responses from the focus group questions need to be presented and discussed as they relate to the professional development training and impact teacher's attitudes, skills levels and perceptions about what students can do using technology. According to all seven teachers interviewed the training did meet their needs. The responses varied from 'very beneficial' to 'exceeding my needs' and one teacher reported that it only "met some of her needs" and it would be a 'tool' to be used when needed. This evidence was also reported by McGrail, 2006 that several teachers felt this was unrealistic but possible for

technology to become part of their tool box and use it only when necessary. Teachers expressed concerns about the difficulty of having to "use it all of the time" and the pressure negatively impacted their attitudes and individual teaching practices.

To elaborate on what teacher found to be most beneficial was Keynote used for presentations, podcasts and iMovie. Most enjoyed the hands on experiences but some reported that waiting for others to finish and catch up, also, several reported the slow pace during parts of the training as least beneficial.

When asked about foreseeable challenges teachers were concerned with tech support and not getting things fixed in a timely manner. It was also noted that it was hard to teach and provide technical support too! Equipment was still lacking and teachers had to share computer carts. Some reported that they did not have LCD projectors to use in their classroom and therefore it was much more difficult for students to see the instruction. Others worried because they did not have access to the proper peripherals and cables. Another discussed was the amount of time it would take for students to gain proficiency and the lack of time during the day. All in all, lack of equipment and prompt technical support seemed to be most challenging.

The time of MacBook expected use by students varied from daily to 2-3 times per week, quite a bit, a lot, and as much as possible. This reveals teachers are up for the challenge and see the importance of integrating technology to the best of their abilities. When asked how they expect to use the MacBook their responses were mainly for presentations and vocabulary. Research supports these results as these skills are perceived to be of importance in IS/IT technologies and show that personal productivity software and desktop operating systems topped the list.

Furthermore, teacher ideas and perceptions varied from those in administration as did in the research. Teachers felt administrators did not make it clear as to their expectations about how technology should be used in different areas of the curriculum. Six of the seven teachers reported that they did not know how their principal expected them to use technology. This conceptual disagreement among teachers in this study can be attributed to their differing images of 'what counted' as learning activities in specific content areas (Windschitl & Sahl, 2002, p.198) and the roles they envisioned for technology in facilitating such learning activities. McGrail states that, contexts for technology integration are dependent on the teacher attitude, grade level, class profile, and philosophical orientation.

When asked about the kinds of support needed to teach using the new technology, teamwork and support were noted to be significant. Additionally, training was mentioned by over half of the respondents and the ability to learn how to effectively use the equipment. Several teachers identified they needed additional equipment such as LCD projectors or the newly learned skills would not be implemented. A crucial part of the 1 to 1 Program should be to provide ongoing support once the training has ended. Apple Classrooms of Tomorrow affirms that it is vital for the success of the program to provide ongoing support to teachers because if they cannot obtain the help they can get discouraged and frustrated and possibly abandon this new way of teaching.

Summary

Educational Technology Per/Post Survey, Part 1: How Do Teacher's Use Technology established that personal productivity ranked highest of teacher's use of technology however informational literacy skills need to be addressed. Teachers felt confident about using word processing to create documents and were excited about using and using presentations to deliver instruction. This shows a relationship between similar results (Kim, Hsu & Stern,

2006) states that of the skills perceived to be of importance in IS/IT technologies showed that personal productivity software and desktop operating systems topped the list. Clearly, this gives evidence to and supports that most teachers have the desire to increase their skill level thus increasing their ability to use technology effectively for instruction. The overall mean from Table 4: Educational Technology Teacher Pre/Post Survey, Part 1: How Do Teachers Use Technology indicates a 31% gain in 'How Teacher's Use Technology'. This improvement in teacher's skill level when using technology is closely correlated to the effectiveness of the professional development training teacher's attended.

Online learning opportunities were certainly deficient and informational literacy needs to be considered a critical issue. An online learning environment have been shown to provide a strong framework for the development of personal and processed knowledge while initiating effective communication that place the learner in control while promoting dialogue in virtual spaces resulting in a productive and deep knowledge base. Information literacy skills were found consistently low in this study. As evidence, Part 1 of the survey initially showed that 70% of teachers did not communicate electronically with students, 0% of teachers used iChat, and only 2% had used blogs, while

21% used email. In a related study Kirkwood (2002) shows similar findings that indicate (70%) had little or no experience of communicating with other people using conferencing, chat or newsgroup facilities. Kirkwood explains that these findings suggest that many of the respondents had more than just basic ICT skills, but that their information literacy skills were much less well developed. Therefore, it is critical to see how educational curriculums can better meet the needs of the industry and stay abreast of these skills gaps. There have been a number of explanations and causes for the skills gap: one is that rapid changes in technology make it difficult for individuals to obtain the requisite level of experience in these before these skills become outdated, and the other is the mismatch between academic perceptions of needs and requirements (curriculums) and industry skills requirements (Scott, Alger, Pequeno & Sessions, 2002; Milton, 2000). These skills required to work on-line required of both teachers and learners to develop new skills and educators should address this by creating effective on-line activities that employ practical experiences while acquiring new skills. Kim states that by improving and updating IS/IT curriculums it will create better trained IS/IT students for

the competitive job market, and enable firms and recruiters to effectively hire staff with current up-to-date skills.

Educational Technology Per/Post Survey, Part 2:

Teacher's Attitudes about Technology were overall positive. Moreover, the results can be compared to a similar study which concluded only one variable, namely teacher's experience in teaching using technology, contributed significantly to imply that the more training and experience corresponds to more positive attitudes toward computers (Subhi, 1999). Similar findings correlate to the data generated from the Educational Technology Teacher Survey and the Educational Technology Teacher Survey Post Training. Prior to beginning the training attitudes were initially measured as high, as evidence 91% of teacher felt it was worth the effort to integrated digital media applications into their teaching. After careful analysis of the data in Part 2: Teachers Attitudes about Technology; Table 5 established a mean score of 17% increase of teachers with a positive attitude about technology. Most researchers agree that successful use of computers in the classroom is dependent on positive teacher attitudes toward computers (Lawton & Gerschner, 1982). In general, the results of this survey and the focus group responses from Question 1 on Appendix 4 revealed that teacher attitudes toward computers

were generally positive which is consistent with the findings of two previous studies (Jackson, Messer & Mohamedali, 1987; Heywood & Norman, 1988). The end results prove that the majority of teachers are excited about learning how to integrate technology into their classrooms and want to develop the skills that will help them to facilitate that learning to students.

Educational Technology Per/Post Survey, Part 3:
Perceptions as to How Students will Use Technology show an overall mean of 42% increase as to how student will use the new technology in the classroom. Overall the intentions are good but the reality is student's skills are lacking which in part was due to little time spent on the computer. As evidence 39% of students spent little to no time on the computer each week. While 70% had did not use technology to communicate with others. This is one more finding to support low informational literacy skills. The highest perceptions of technology use by students was in completing assignments using word processing, creating charts and graphs, and making presentations. Also scoring high on the post survey was the use of iMovie and iPhoto to create digital stories. These are seen as end user fundamental skills and are certainly a start in developing 21st century skills required in today's work force.

Now to address the focus group responses; it confirmed the importance of administrative support and professional development as a means to development of positive attitudes and assist teachers on the best ways to integrate technology in the classroom. Responses revealed that teachers need additional training and support and as a crucial element of this program they should be to provide with ongoing support once the training has ended.

Apple Classrooms of Tomorrow reported that teacher's need ample training and support, and teachers want "challenging experiences and opportunities to collaborate seriously with their peers who have good ideas and are excited about what they are doing." Certainly teamwork was mentioned and importance of collaboration with other and sharing 'what works' which supports a constructivist style of learning. Many teachers felt they would use the new technology to create presentations, podcasts, and introduce units or vocabulary. The positive responses were offset with concerns asserting lack of time, having to share equipment, and worries about receiving technical support in a timely manner. Overwhelmingly, six of the seven teachers did not know the principals expectations as to how to use the new technology.

The results from Educational Technology Per/Post Survey show that the majority of teachers had improved attitudes, expanded skills levels, and increased their perceptions as to how students would use the new technology as a result of the professional development training.

CHAPTER FIVE:

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Included in Chapter Five was a presentation of the conclusions gleamed as a result of completing the project. The conclusions extracted from the project follows. Further, the recommendations extracted from the project are presented. Lastly, the Chapter concludes with a summary.

1 to 1 Learning Programs can afford students with many opportunities to develop 21st century skills. When teachers become more familiar with effective ways of implementing the program and broaden their technical skill levels this type of constructivist teaching can become part of their teaching pedagogy. Teachers' need to embark on new ideas to support their individual needs and be provided with support that is ongoing and collaborative and teachers need to avoid teaching in isolation (O'Bannon, 2004). Along with support, a clear vision and defined goals should be used as a way of successfully integrating the use of computers in the classroom.

When a teacher's attitude favors technology and effective professional development is offered, improved technological skills can show results that produce enhanced

learning. Laptop technology initiatives are the latest in a long line of technological discoveries that enhance the narrative of progressive goals of technology envisioned for education, literacy, and learning (Selfe, 2000). As a way of being competitive tomorrow, today's students need to develop techniques that readily adapt to changes as they occur (enGuage, 2003). Teachers with a positive attitude about using technology is crucial especially in the classroom because teacher's attitude can often transcended to the growth and development of student's attitudes.

In a constructivist classroom, technology can play an important role in discovery and student-centered learning. The link between constructivist classrooms and the use of technology is a natural one according to Lunenburg (1998), who asserted that each has its core value of student achievement and learning. Researchers have explained that there is an association between self-efficacy and teachers attitudes toward technology and positive teacher attitudes toward technology are necessary for its effective use in the classroom (Lawton & Gerschner, 1982). Furthermore, along with the importance of having a positive attitude about teaching and learning using technology, specific skills need to be identified as ways to facilitate that learning in a 21st century classroom.

These 21st century skills were described as developed digital-age literacy, inventive thinking, effective communication, and high productivity. Teachers need to learn how to successfully scaffold these skills to students as way of ensuring that students will thrive and survive in this digital age. These 21st century skills are constituted as the building blocks in education and viable to the success of teachers/students participating in laptop learning programs. Advancement in societies will require a deeper understanding of information in all of its forms in order to promote the advancement of skills required to use these broad ranges of literacy's. Innovative skills for working on-line are essential for both teachers and learners-they are not ones that most people already possess (Kirkwood & Price, 2005). Development of global awareness and interpersonal relationships that span the globe will help students develop an appreciation of similarities and differences that exist culturally. Teachers and students creative ways of using inventive thinking skills to make inferences and decipher information while evaluating a wide range of academic domains associated with problem-solving contexts. Furthermore, the expectation of employers is a strong knowledge base, diversified social, communication and cooperative skills, flexibility to work in different

contexts and the capacity to manage information and self and others.

When technology is integrated into pedagogical practice, scaffolding is intended to motivate the learner, reduce task complexity, provide structure and reduce learner frustration (McLoughlin & Luca, 1999) and technologies scaffold learning in ways that foster effective communication and build deep knowledge. An online learning environment provides a strong framework to foster the development of personal and processed knowledge while initiating effective communication that place the learner in control while promoting dialogue in virtual spaces resulting in a productive and deep knowledge base.

1 to 1 Learning programs seek to preparing student's to enter the work force with the ability to prioritize, plan, manage data results, and make use of high-tech tools. Over the past several decades, a number of scholars and commentators have argued the leading edge of the economy in developed countries has been become driven by technologies based on knowledge and information production and dissemination (Powell & Snellman, 2004). Personal Productivity is relevant and includes the ability to use PC-based software and the use of spreadsheets, word processing, and related tools important when using information systems

in the global business economy. Additionally, fundamentals included, are coherent writing, ability to ask appropriate questions, effective oral communication skills, and collaborative teamwork skills (Miller and Luse, 2004).

For this to transpire, teachers will have to unlearn much of what they believe, know, and know how to do (Ball, 1998) while forming new beliefs, developing new knowledge, and mastering new skills. Preparation of teachers to teach in this type of learning environment can be done through effective professional development. Even though there are many models, two models described were Apple Classrooms of Tomorrow (ACOT) and Quality Teaching and Learning (QTL). Ringstaff, Sandholtz, & Dwyer, (1992) state ACOT found technology changed teacher and student roles in the classroom as students learned more rapidly about the technology. According to Pierson (2001), teachers must understand how technology connects with both pedagogy and the content of the curriculum; a change in instructional use of computers is dependent upon understanding the instructional practices needed to use technology while teaching the curriculum. While, QTL provides essential modeling and practice components that encourage teachers to assume student roles in a constructivist type of learning environment. Teachers are encouraged to be realistic in

their planning and take into account setting, curricular mandates, lack of time, or lack of equipment.

Brinkerhoff (2006) states the barriers that impact technology integration can be grouped into four categories: resources, institutional and administrative support, training and experience, and attitudinal or personality factors. As a means of measuring the attitudinal factors the use of a survey was shown to be an effective tool of measurement. To present resolve to the original question addressed, "Do teacher's attitudes about implementing technology change after attending effective professional development training (with a technical emphasis) thus, becoming more eager to learn and use 21st century skills in the classroom?" "How do they change?" "Why?" The answer is "Yes" attitudes do improve when technical skill levels are expanded due to the cognitive support that is provided during professional development trainings.

Although teacher's attitudes are generally positive as they pertain to technology they can be improved when professional development training is provided. This change occurs and they move through stages of Instructional Evolution. To describe this evolution Sandholtz, Ringstaff, & Dwyer, (1997) suggests that once they learn the basics and move beyond the struggle 'adaptation' occurs and so does

an increased productivity, but little change occurs in teaching and learning practices. Next the move is into 'appropriation' and technology becomes an effortless tool to accomplish instruction and management goals. Finally, 'invention' when technology becomes a flexible tool in the classroom. Learning becomes collaborative, interactive and customized; new teaching and learning practices emerge. As their ability to utilize previous skills and integrate them with the new skills therefore, improving their ability to utilize technology, they gain confidence.

The change in attitude is connected to effective professional development training because this helps scaffold the learning of these new technologies and provides cognitive support and tools to support knowledge. McLoughlin & Luca, 2002, identifies this new learning with technology as an information vehicle of cognitive information that is being assessed, compared and evaluated. Learning is supported with real-world simulations and information is shared, compared, hypostasized and argued. Professional development also provides a social medium for conversation, communication and collaboration. Teachers are provided the opportunity to share intellectually and learn through reflection. Therefore, attitudes about technology change when skills improve and ideas and implementation occurs

using the technological skills acquired. The results showed consistency between teacher's use of technology and a correlation with their instructional beliefs. Constructivist beliefs also resulted in technology being used to promote student-centered learning with a hand-on approach. Long term professional development programs should support the kinds of changes required in this digital age to implement technological standards and create experiences that will engage students in productive participation that promotes the development of 21st century skills.

Long term professional development programs support the kinds of changes required in this digital age to implement technological standards and create experiences that will engage students in productive participation that promotes the development of 21st century skills. Lastly, the recommendations derived from the project were presented.

Conclusions

1. Implementation of 1 to 1 Learning Programs can help bridge the skills gap by providing teachers/students with 21st century skills.
2. Teacher's attitudes about technology are generally positive.
3. Teacher's technical skill levels can advance from 'Entry to Invention' if there is ongoing effective professional development training and support.
4. There is a skills gap in Information Literacy and research concluded that it is one of the most important in the 21st century global economy.

Recommendations

The recommendations resulting from the project follows.

1. Teachers should be provided with necessary equipment and the technological tools such as LCD projectors, cables, and other peripherals that are needed to fully implement the 1 to 1 Learning Program in the classroom.
2. Administrators and teachers should have clearly established and defined goals that are shared as they apply to 1 to 1 Learning Program.

3. Teachers need to be provided with continuous support and on-going professional development training designed to increase individual technological skill levels.
4. Prompt technical support from the district should be provided to classroom teachers in addition to a developing an on-site support team as a means of trouble shooting problems quickly when they arise.

Summary

Chapter Five reviewed the conclusions extracted from the project. The rationale of the project was stated as development and implementation of a survey with the intent of developing a clearer understanding of how teacher's attitude affect their ability to achieve success and overcome challenges associated with the implementation of a 1 to 1 Learning Program. With teachers at the forefront of technology in the classroom a good attitude is important. Overall, teacher's attitudes were found to be generally positive about using technology. The development of technical skills is crucial to transition from dominating technical issues to technology as a flexible tool in the classroom. A skills gap was identified in the research

literature. A skills gap in Informational Literacy was identified as the inability to access, evaluates, and uses information from a variety of sources. In this digital-age informational literacy is most important because it is how global economies communicate. It can concluded that 1 to 1 Learning Programs seek to bridge these skills gap by building on the premise that every student has a laptop that is connected to the Internet 24/7 and is provided adequate instruction from a skilled professional that possess a positive attitude of the teacher.

APPENDIX A:
INFORMED CONSENT FORM

INFORMED CONSENT FORM

21st Century Skills 21st Century Learners

The study in which you are being asked to participate is designed to investigate teacher's attitudes about technology. This study is being conducted under the direction of Dr. Lee Grafton and Mrs. Jennifer Shopshear with the supervision of DR. BRIAN NEWBERRY, PROFESSOR OF COLLEGE OF EDUCATION, DEPARTMENT OF SCIENCE, MATH, AND TECHNOLOGY. This study has been approved by the Institutional Review Board, California State University, San Bernardino.

In this study you will be asked take an online survey prior to and at the conclusion of your 1 to 1 Learning training session. The EDUCATIONAL TECHNOLOGY TEACHER SURVEY should take about 20 to 30 minutes to complete. All of your responses will be held in the strictest of confidence by the researchers. Your name will not be reported with your responses. All data will be reported in group form only. You may receive the group results of this study upon completion at JANUARY 31, 2008 at the following location PALM SPRINGS UNIFIED SCHOOL DISTRICT, 980 E. TAHQUITZ CANYON WAY, PALM SPRINGS, CA 92262.

Your participation in this study is totally voluntary. You are free not to answer any questions and withdraw at any time during this study without penalty. There is not any foreseeable immediate or long range risks involved in this study. Teachers will not be asked to do anything outside of the normal district technology curriculum and teaching practices. The intended benefit is to understand teacher's attitudes toward technology and provide the best trainings

available to help with the district's newly implemented 1 to 1 Learning Program.

If you have any questions or concerns about this study, please feel free to contact PROFESSOR BRIAN NEWBERRY PH.D at (909) 880-7630.

By placing a check mark in the box below, I acknowledge that I have been informed of, and that I understand, the nature and purpose of this study, and I freely consent to participate. I also acknowledge that I am at least 18 YEARS OF AGE.

Place a check mark here ☐ Today's date: _____

APPENDIX B:
EDUCATIONAL TECHNOLOGY
TEACHER SURVEY

APPENDIX B:
EDUCATIONAL TECHNOLOGY
TEACHER SURVEY

Many of the questions to follow reference "digital media." Digital media refers to computers, online applications, Interwrite Pads, and/or Qwizdoms. If you do not use one of those mediums do not consider it in the question.

1. I use digital media (computers, software, online resources, etc.) to prepare instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

2. I use digital media (computers, software, online resources, etc.) to deliver instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

3. I post and share information (e.g. assignments) with parents and students electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

4. I integrate the use of digital media with other instructional strategies (e.g. group work in my instruction.)

Never

At least once a term

At least once a month

At least once a week

Daily

5. I post and share information (e.g. lessons/ instructional resources) with my colleagues electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

6. I access curricular resources from the District's shared resources (District online resources, District shared files).

Never

At least once a term

At least once a month

At least once a week

Daily

7. I use digital media for record-keeping (e.g. grades).

Never

At least once a term

At least once a month

At least once a week

Daily

8. I use digital media to access student information for data-driven decision-making to improve student achievement.

Never

At least once a term

At least once a month

At least once a week

Daily

9. I communicate electronically with colleagues in my school regarding instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

10. I communicate electronically with colleagues outside of my school regarding instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

11. I communicate with parents electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

12. I communicate with students electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

13. I am confident using digital media in instruction.

Strongly disagree

Disagree

Agree

Strongly agree

14. I think it is worth the effort for me to learn how to integrate digital media applications into my teaching.

Strongly disagree

Disagree

Agree

Strongly agree

15. I believe that all students should have an opportunity to use digital media applications at school.

Strongly disagree

Disagree

Agree

Strongly agree

16. I believe the use of digital media helps students learn academic content.

Strongly disagree

Disagree

Agree

Strongly agree

17. I believe that students need to learn how to use digital media to be prepared for the future.

Strongly disagree

Disagree

Agree

Strongly agree

18. Digital media applications help me be a better teacher.

Strongly disagree

Disagree

Agree

Strongly agree

19. Digital media applications enable me to be more efficient and productive.

Strongly disagree

Disagree

Agree

Strongly agree

20. Digital media applications take away from instructional time.

Strongly disagree

Disagree

Agree

Strongly agree

21. Digital media create more problems for me than they're worth.

Strongly disagree

Disagree

Agree

Strongly agree

22. Digital media applications help motivate students to learn.

Strongly disagree

Disagree

Agree

Strongly agree

23. My students are more likely to be on task when we use digital media for teaching and learning.

Strongly disagree

Disagree

Agree

Strongly agree

24. My students are more interested in learning when we use digital media applications in class.

Strongly disagree

Disagree

Agree

Strongly agree

25. In my classroom, I let my students decide WHEN to use technology.

Never

Sometimes

Usually

Always

26. In my classroom, I let my students decide HOW to use technology.

Never

Sometimes

Usually

Always

27. In my classroom, students work in teams with other students when using technology.

Never

Sometimes

Usually

Always

28. How often do your students use word-processing programs to complete written work assignments?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

29. How often do your students use the Internet to find information for assignments?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

30. How often do your students correctly cite (using the MLA or APA format) references they use to complete assignments?

Never

Sometimes

Usually

Always

31. How often do you require your students to check online resources for bias and reliability?

Never

Sometimes

Usually

Always

32. How often do your students use technology to solve real-world problems (for example, measuring and recording the amount of pollution in a pond)?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

33. How often do you have your students use information from CD-ROMS or the Internet to predict real world changes (for example, using information about populations of countries to predict which countries will become the biggest)?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

34. How often do you have your students use technology to acquire math content standards?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

35. How often do you have your students use technology to acquire reading content standards?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

36. How often do you have your students use technology to acquire writing content standards?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

37. How often do you have your students use technology to acquire science content standards?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

38. How often do you have your students use technology to acquire social studies content standards?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

39. How often do your students engage in netiquette and ethical behavior when using technology resources to complete assignments?

Never

Sometimes

Usually

Always

Don't know

40. How often do your students use technology to communicate with others (for example, experts, other students, community members) outside of your classroom as part of a class assignment?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

41. How often do your students discuss technology related social issues (for example, copyright laws, plagiarism, internet safety, cyber bullying) as part of a class assignment?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

42. On average, my students spend about _____ each week using computers in school.

Little or no time

15-30 minutes

30 minutes to one hour

One to two hours

Two to five hours

Five to ten hours

More than ten hours

43. To complete assignments in my class, my students have created or used the following. (Please select all that apply.)

Word-processed documents

Spreadsheets

Charts and/or Graphs

Presentations using PowerPoint or KeyNote

Electronic Portfolios

Digital Stories using Photostory, iMovie, iPhoto or
comparable programs

Podcasts

Webpages

Wikispaces

Blogs

Garageband (or comparable applications)

GoogleEarth (or comparable programs)

E-mail

iChat

Other, please specify environment. (Select all that
apply.)

44. Please select all of the statements below that
describe your learning;

My students have access to computers in a school lab or
the school library.

My students have no access to computers in my
classroom.

My students have access to 1-2 computers in my classroom.

My students have access to 3-4 computers in my classroom.

My students have access to 5-10 computers in my classroom.

My students share laptop access with other classrooms.

Each of my students has daily laptop access.

Each of my students has daily laptop access and takes the laptop home.

I have access to an up-to-date computer in my classroom for my work.

I have access to a laptop that I can take home to do work off-campus.

I have an LCD projector in my classroom.

45. What type of training program are you participating in?

Laptop 4 Day Training

Laptop 2 Day Training

EETT Math Program Training

Technology Coach Leadership Training

Afterschool Program Training

Other, please specify

46. We have at least one Site Technology Coach/ Mentor at our school that is available to support me when I have technology questions.

Yes

No

Don't know

47. Please select your school from the list below;

Aqua Caliente EL

Bubbling Wells EL

Cahuilla El

Cathedral City EL

Cielo Vista El

Della S Lindley EL

Edward Wenzlaff EL

Julius Corsini EL

Katherine Finchy El

Landau EL

Rancho Mirage EL

Rio Vista EL

Sunny Sands EL

Two Bunch Palms EL

Vista Del Monte EL

Desert Springs MS

James Workman MS

Nellie N Coffman MS

Raymond Cree MS

Cathedral City HS

Desert Hot Springs HS

Palm Springs HS

Mt San Jacinto Continuation HS

Ramon Academy

Desert Hot Springs Alternative

Adult School

48. Please select the grade levels, subject areas and programs you teach. (Select all that apply).

Grade K-1

Grade 2

Grade 3

Grade 4

Grade 5

Grade 6

Grade 7

Grade 8

Grade 9

Grade 10

Grade 11

Grade 12

After school program

Adult

All Elementary Subjects

ELL Elementary

ELL Secondary

Elementary Special Education

Secondary Special Education

Secondary English/Language Arts

Secondary Math

EETT Math Program for Middle Schools

Secondary Science

Secondary Social Studies

Secondary Other

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APPENDIX C:
EDUCATIONAL TECHNOLOGY
TEACHER SURVEY
POST TRAINING

APPENDIX C:
EDUCATIONAL TECHNOLOGY
TEACHER SURVEY
POST TRAINING

Many of the questions to follow reference "digital media." Digital media refers to computers, online applications, Interwrite Pads, and/or Qwizdoms. If you do not use one of those mediums do not consider it in the question. All statements refer to what you plan to do NEXT school year.

1. I will use digital media (computers, software, online resources, etc.) to prepare instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

2. I will use digital media (computers, software, online resources, etc.) to deliver instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

3. I will post and share information (e.g. assignments) with parents and students electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

4. I will integrate the use of digital media with other instructional strategies (e.g. group work in my instruction.)

Never

At least once a term

At least once a month

At least once a week

Daily

5. I will post and share information (e.g. lessons/ instructional resources) with my colleagues electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

6. I will access curricular resources from the District's shared resources (District online resources, District shared files).

Never

At least once a term

At least once a month

At least once a week

Daily

7. I will use digital media for record-keeping (e.g. grades).

Never

At least once a term

At least once a month

At least once a week

Daily

8. I will use digital media to access student information for data-driven decision-making to improve student achievement.

Never

At least once a term

At least once a month

At least once a week

Daily

9. I will communicate electronically with colleagues in my school regarding instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

10. I will communicate electronically with colleagues outside of my school regarding instruction.

Never

At least once a term

At least once a month

At least once a week

Daily

11. I will communicate with parents electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

12. I will communicate with students electronically.

Never

At least once a term

At least once a month

At least once a week

Daily

13. I will be confident using digital media in instruction.

Strongly disagree

Disagree

Agree

Strongly agree

14. I think it is worth the effort for me to learn how to integrate digital media applications into my teaching.

Strongly disagree

Disagree

Agree

Strongly agree

15. I believe that all students should have an opportunity to use digital media applications at school.

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Agree

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18. Digital media applications will help me be a better teacher.

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Disagree

Agree

Strongly agree

19. Digital media applications will enable me to be more efficient and productive.

Strongly disagree

Disagree

Agree

Strongly agree

20. Digital media applications will take away from instructional time.

Strongly disagree

Disagree

Agree

Strongly agree

21. Digital media will create more problems for me than they're worth.

Strongly disagree

Disagree

Agree

Strongly agree

22. Digital media applications will help motivate students to learn.

Strongly disagree

Disagree

Agree

Strongly agree

23. My students will be more likely to be on task when we use digital media for teaching and learning.

Strongly disagree

Disagree

Agree

Strongly agree

24. My students will be more interested in learning when we use digital media applications in class.

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Disagree

Agree

Strongly agree

25. In my classroom, I will let my students decide WHEN to use technology.

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Usually

Always

26. In my classroom, I will let my students decide HOW to use technology.

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27. In my classroom, students will work in teams with other students when using technology.

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2-4 times per week

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29. How often will your students use the Internet to find information for assignments?

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Never
Once a term
Once a month
Weekly
2-4 times per week

36. How often will you have your students use technology to acquire writing content standards?

Never
Once a term
Once a month
Weekly
2-4 times per week
Daily

37. How often will you have your students use technology to acquire science content standards?

Never
Once a term

Once a month

Weekly

2-4 times per week

Daily

38. How often will you have your students use technology to acquire social studies content standards?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

39. How often will your students engage in netiquette and ethical behavior when using technology resources to complete assignments?

Never

Sometimes

Usually

Always

Don't know

40. How often will your students use technology to communicate with others (for example, experts, other students, community members) outside of your classroom as part of a class assignment?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

41. How often will your students discuss technology related social issues (for example, copyright laws, plagiarism, Internet safety, cyber bullying) as part of a class assignment?

Never

Once a term

Once a month

Weekly

2-4 times per week

Daily

42. On average, my students will spend about _____ each week using computers in school.

Little or no time

15-30 minutes

30 minutes to one hour

One to two hours

Two to five hours

Five to ten hours

More than ten hours

43. To complete assignments in my class, my students will create or use the following. (Please select all that apply.)

Word-processed documents

Spreadsheets

Charts and/or Graphs

Presentations using PowerPoint or Keynote

Electronic Portfolios

Digital Stories using Photostory, iMovie, iPhoto
or comparable programs

Podcasts

Webpages

Wikispaces

Blogs

Garageband (or comparable applications)

GoogleEarth (or comparable programs)

E-mail

iChat

Other, please specify

44. Please select all of the statements below that will describe your learning environment. (Select all that apply.)

My students have access to computers in a school
lab or the school library.

My students have no access to computers in my classroom.

My students have access to 1-2 computers in my classroom.

My students have access to 3-4 computers in my classroom.

My students have access to 5-10 computers in my classroom.

My students share laptop access with other classrooms.

Each of my students has daily laptop access.

Each of my students has daily laptop access and takes the laptop home.

I have access to an up-to-date computer in my classroom for my work.

I have access to a laptop that I can take home to do work off-campus.

I have an LCD projector in my classroom.

45. What type of training program are you participating in?

Laptop 4 Day Training

Laptop 2 Day Training

EETT Math Program Training

Technology Coach Leadership Training

Afterschool Program Training

Other, please specify

46. We will have at least one Site Technology Coach/
Mentor at our school that is available to support me when I
have technology questions.

Yes

No

Don't know

47. Please select your school from the list below;

Aqua Caliente EL

Bubbling Wells EL

Cahuilla El

Cathedral City EL

Cielo Vista El

Della S Lindley EL

Edward Wenzlaff EL

Julius Corsini EL

Katherine Finchy El

Landau EL

Rancho Mirage EL

Rio Vista EL

Sunny Sands EL

Two Bunch Palms EL

Vista Del Monte EL

Desert Springs MS
James Workman MS
Nellie N Coffman MS
Raymond Cree MS
Cathedral City HS
Desert Hot Springs HS
Palm Springs HS
Mt San Jacinto Continuation HS
Ramon Academy
Desert Hot Springs Alternative
Adult School

48. Please select the grade levels, subject areas and programs you teach. (Select all that apply).

Grade K-1
Grade 2
Grade 3
Grade 4
Grade 5
Grade 6
Grade 7
Grade 8
Grade 9
Grade 10
Grade 11

Grade 12

After school program

Adult

All Elementary Subjects

ELL Elementary

ELL Secondary

Elementary Special Education

Secondary Special Education

Secondary English/Language Arts

Secondary Math

EETT Math Program for Middle Schools

Secondary Science

Secondary Social Studies

Secondary Other

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APPENDIX D:
FOCUS GROUP QUESTIONS
AND RESPONSES

APPENDIX D:
FOCUS GROUP QUESTIONS
AND RESPONSES

1. Has this training met your needs? Please explain.

Teacher 1: I was new to Apples for the most part, therefore the training was great. I feel more prepared to use my Apple. I learned several things that I can do with it.

Teacher 2: I guess I can say that it will be a tool that will meet some of my needs. It all comes down to if there is time to implement the facets of the Apple programs.

Teacher 3: This training was very beneficial in teaching me to use programs that I have not yet had any experience with. The hands on nature of the training, and allowing us time to actually work with the programs was great.

Teacher 4: Yes, I learned how to use my MacBook. Without the training, I would be feeling too overwhelmed to even begin trying to use them with the students.

Teacher 5: Yes!!!! This new technology is what I've wanted to learn.

Teacher 6: The Apple training met and exceeded my needs for the time being. There are so many great things we can do with these Mac Books and I think in the years to

come we will begin a larger implementation of some of the assignments our instructor showed us examples of. For the year coming up I think we will unfortunately not utilize everything that was shown to us do to lack of computer access and the limited knowledge our students have of technology. Some of the things we were shown (how to create a pod cast or movie) took us all day as adults who were focused and excited to get the job done. That is not an assignment I could see giving my students anytime early next year as many of the kids I teach do not even have a computer in their home so we will be learning the basics, such as how you turn it on! The training was by far the best I have ever taken, and the most applicable to things that I truly will use to enhance my student's learning.

Teacher 7: As an intro class, yes.

2. What part of the training did you find to be most beneficial? Please explain.

Teacher 1: I enjoyed the Keynote and podcasts. I will be using both of them with my students.

Teacher 2: I guess the gaining knowledge of the many programs that can be used for teaching. It will

require practice on my part to be proficient in teaching my students how to use the programs.

Teacher 3: Being able to use the programs in hands on fashion was very helpful because I was able to see exactly what was being talked about.

Teacher 4: Just getting an overview of how to use all the different programs was most beneficial to me. Now that I know the basics, I can explore the programs deeper on my own.

Teacher 5: All of it. Especially learning about Garageband, making an iMovie, making a DVD, and a podcast.

Teacher 6: It was most useful for me to have Linda go over all the parts of our Mac Books and give us an overview of how they all work and what we can use each of them for. If she had not done that I would now be sitting here with this computer wondering what things are and be scared to try things in case I would break them, or frustrated because I could not get things to work.

Teacher 7: Actually using the programs, instead of just hearing about them. We made a movie and a podcast.

3. What part of the training did you find to be least beneficial? Please explain.

Teacher 1: I wish we would have had more time to practice what we learned. I am afraid I will forget all the information since I only did each thing once.

Teacher 2: No Comment.

Teacher 3: The pace of the training was a little slow at times.

Teacher 4: Nothing. I thought the whole 4 days was great!

Teacher 5: Having to wait while others finished their projects. Also spending so many days in a row in front of a computer screen really messed up my eyes & my brain.

Teacher 6: There was not a single part of the training that was not useful. That is why I am so excited about this training. Every bit of the four days was time well spent. There was no wasted down time where I felt like the time could have been used better. Anytime that we had a few minutes in class we were allowed to try more things and then have Linda come over and answer us directly if we had a question about what we were doing. The thing I loved the most about that is, I only can remember one time when our instructor said she did not know how that would work, and that was about a product that did not relate to Apples.

Teacher 7: The part when you have to wait for other people to catch up can't help that.

4. What challenges do you expect to face as you implement the technology into your classroom? Please explain.

Teacher 1: The tech. Not working correctly. Not getting things fixed in a timely manner. Students asking me questions I do not know the answers to.

Teacher 2: Students need of help. It is hard for one person to handle multiple questions as well as technical assistance. Also, the availability of computers to use in my room. The computers will have to be shared with other classes. Technical assistance from the District. At this point much of the system preferences are blocked. We cannot adjust or modify settings in order to get the best use of the computer.

Teacher 3: Our school still does not have the equipment needed. We need LCD projectors to really be able to use the equipment with our classes.

Teacher 4: I think since its brand new, it will be a challenge learning to manage the class. But in time, I will learn how to effectively manage the classroom.

Teacher 5: Not having access to peripherals like cables, disks, or not having enough time for kids to gain

experience in using to proficiency.

Teacher 6: One of the first challenges will be actually getting one of the computer carts into my classroom. I know there will be high demand for them and only two I believe to go around. The second challenge once we actually get them into our classrooms will be teaching the kids the very basics about computers before we can get on to the cool stuff. Just the few kids that I have had do word processing this year have been frustrating for me to watch because they never really use a computer so when I would ask them to type the final copy of a letter that was one (short) paragraph long, it would take them over an hour!

Teacher 7: Getting hold of a LCD, implementing it into the curriculum with minimal problems. Also challenges of needing additional equipment and not having them. The top one is having questions or problems and having to wait for help or not getting help at all.

5. How much do you think you'll use the MacBooks with the students next year?

Teacher 1: I will be able to use them at least twice a week for half of the day.

Teacher 2: Daily

Teacher 3: As much as possible.

Teacher 4: I'll be using them as much as I can. I think my class specifically will have access twice a week.

Teacher 5: Quite a bit, plus I think we'll each be trying different things, and we'll encourage & help each other, as well as spark each others' interests to try other things.

Teacher 6: I hope I will get a chance to use the Mac Books with my students a lot next year. I am sure it will engage them in learning much more than I can by just talking to them about the topic we are discussing.

Teacher 7: I am a reading intervention teacher who is not on the rotation to get the ones for the students to use.

6. How do you expect to use the MacBook?

Teacher 1: I plan on using them for research, reading counts, final presentations, keyboarding and publishing writing.

Teacher 2: I will use the MacBook for Power Point. Also, making podcasts to extend learning. It will be a step by step process. I eventually want to use all programs but don't see it happening immediately.

Teacher 3: I would like to use it as a presentation tool as well as in the ways that we were shown in training.

Teacher 4: I'm not exactly sure yet. I'm planning on using my own MacBook to create keynote presentations, podcasts, and basic word documents. I'm expecting to have my students use them to do their writing. It will be so much easier for them to revise and edit their writing! I'm also hoping to have my students use Comic Life, create keynotes, and podcasts. But, one thing at a time!

Teacher 5: Quite a bit, plus I think we'll each be trying different things, and we'll encourage & help each other, as well as spark each others' interests to try other things.

Teacher 6: Right now I am just concerned about using the Mac Book to at least introduce units, do key vocabulary for each story, and then I would like to see if I could get the kids to do some type of unit project at the end to show what they have learned. I also like the idea of them using "Keynote" or "Pages" (I cannot remember which) to use the postcard format for letter writing. Once again for myself, I would like to put together some video clips of the kids that I can show at Back to School Night and maybe even make a video of the year that they can take home with them when the school year ends. I am almost

overwhelmed by all the things I *want* to do with these computers!

Teacher 7: Use mine to show intro to units or vocabulary.

7. How does your principal's expect you to use technology?

Teacher 1: I am not sure. I think she wants us to use them for writing and teaching vocabulary.

Teacher 2: Not specifically known yet.

Teacher 3: To be able to implement technology in our own classrooms, to keep an open mind and be willing to work through challenges that we will face in order to use the technology.

Teacher 4: I don't know the exact expectations yet. I just know that my third grade class will have access to the laptop carts twice a week.

Teacher 5: Not sure about that one!

Teacher 6: She has not really said yet. It seems that at this point she is trying her best to provide us with some and is going to have some people implement it first and then try to get everyone on board after some initial people have started using it.

Teacher 7: I am not sure how I am supposed to use it with reading intervention classes.

8. What kind of support will you need in order to teach using the new technology?

Teacher 1: I will need reminder trainings during the year.

Teacher 2: Additional trainings on specific programs.

Also, work with other teachers to learn together will be beneficial.

Teacher 3: Really I just need to learn how to use the equipment.

Teacher 4: I feel like I need more financial support! I really feel like it will be hard to not have my own LCD projector. If I have to continuously check one out and set it up, take it down, etc., I will be less likely to show my students keynotes, podcasts, or videos. Also, we will be needing support from techs who know how to fix problems quickly.

Teacher 5: Willingness of everyone as a team to figure it all out!

Teacher 6: We will need someone in the school who is going to be able to answer questions that will come up about the various programs that are installed on these computers as well as what to do when our computer is doing _____?????

Teacher 7: Hardware support and support with the programs. How to use them and what short cuts are out there.

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